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Flood Plain Management Study Mattawoman Creek and Tributaries

Charles and Prince Georges Counties Maryland

2450 0 FLOOD PLAIN MANAGEMENT STUDY

FOR

MATTAWOMAN CREEK AND TRIBUTARIES

CHARLES AND PRINCE GEORGES COUNTIES, MARYLAND

March 1983

Soil Conservation Service
Room 522, 4321 Hartwick Road
College Park, Maryland 20740

SUMMARY

This study provides water surface elevations and peak streamflows for present condition and future condition floods of the 0.2, 1, 2, 10, and 50 percent chance of occurence in the Mattawoman Creek Watershed in Prince Georges and Charles Counties, Maryland, for the main stem of the Mattawoman Creek and its three major tributaries. The present condition 100-year flood plain is mapped and stream profiles are plotted for the present condition floods.

The narrative describes the watershed briefly with emphasis on the flood plain which is largely woodland and swamp, especially the lower reaches of the watershed. Some suburban development has taken place upstream. About twenty buildings are affected by flooding and most of these are located in two subdivisions which encroach on the flood plain.

Both counties expect future development to threaten the flood plain. This report presents a number of management measures that might be implemented to minimize future flooding.

Information on the models used to develop the water surface elevations may be obtained from the Maryland State Department of Natural Resources, Water Resources Administration, Flood Management Division, Tawes State Office Building, Annapolis, Maryland 21401 (phone 301-269-3825). Copies of this report and general information on the watershed may be obtained from the Soil Conservation Service, 4321 Hartwick Road, College Park, Maryland 20740 (phone 301-344-4180).

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FOR MATTAWOMAN CREEK AND TRIBUTARIES,
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INTRODUCTION

This study was prepared by the United States Department of Agriculture, Soil Conservation Service (SCS) and the Maryland Department of Natural Resources, Water Resources Administration (WRA). The Maryland National Capital Park and Planning Commission, the Maryland Geological Survey, and both the Charles and Prince George's Soil Conservation Districts all provided data for the study.

In March 1969, The Maryland National Capital Park and Planning Commission requested assistance from DNR in delineating the flood plains of several streams in Prince George's County, one of which was the Mattawoman Creek.

The following local sponsors applied to the Secretary of Agriculture in January 1971 for Public Law 566 assistance:

Prince George's Soil Conservation District
Maryland National Capital Park and Planning Commission
Board of County Commissioners, Prince George's County
Charles Soil Conservation District
County Commissioners of Charles County
Maryland Department of Parks and Forests

The Soil Conservation Service conducted a field examination of the Mattawoman Creek Watershed in 1978. The field examination report, published in December 1978, stated that a structural flood prevention project could not be economically justified. The report recommended that a study be made to delineate the flood plain to facilitate flood plain management.

One of the sponsor's objectives was to delineate the 100-year flood plain of the Mattawoman Creek on topographic maps as an aid to local flood plain management. There is no delineation of the flood plain limits of Mattawoman Creek at present as detailed topographic mapping on a large scale is not available for Charles County.

An immediate need exists in the watershed to delineate those areas with a potential flooding hazard, where development pressures are strong, to enable the local units of government to formulate appropriate land use and development regulations to reduce flood damages and develop an effective flood plain management program. Mattawoman Creek flood plain is under increasing urbanization pressure due to its proximity to Washington, D.C., especially that portion of the watershed in Charles County. This study will help define the limits of allowable development, particularly in Charles County where there are no Federal Insurance Administration (FIA) maps available.

In August 1976, the Federal Insurance Administration (FIA), Department of Housing and Urban Development, published Flood Insurance Rate Maps for the unincorporated areas of Prince George's County, which included a delineation of the 100-year flood line on the Prince George's side of Mattawoman Creek done by approximate methods. A restudy of the county, which will have detailed mapping of the Mattawoman Creek flooding using the data published in this study, now has been initiated and will be published in 1984.

As part of the detailed studies underway amd administered by the Federal Emergency Management Agency (FEMA), detailed maps for the Charles County side of Mattawoman Creek are being prepared at a scale of 1 inch to 500 feet with a contour interval of 5 feet. The final maps, using the hydraulic and hydrologic data from this study to delineate the 100 and 500 year flood plains are expected to be published in 1983. The FEMA Flood Insurance Study was initiated after the SCS-DNR study was underway.

The Soil Conservation Service (U.S. Department of Agriculture) carries out flood plain management studies under the authority of Section 6 of Public Law 83-566, in response to Recommendation 9(C), "Regulations of Land Use," of House Document No. 465, 89th Congress, 2nd session, and in compliance with Executive Order 11988 (February 10, 1978). The study was conducted in accordance with the 1971 Joint Coordination Agreement, between the Soil Conservation Service and the Maryland Department of Natural Resources.

The Water Resources Administration (WRA) of the Maryland Department of Natural Resources is charged with the State's responsibility to implement a sound flood plain management program under the Natural Resources Articles 8-9A-01 et. seq. The Flood Management Division of the WRA coordinates flood plain studies among the Counties, Regional Agencies, and State and Federal Agencies.

Hydraulic and cross-section data were obtained by field surveys with elevations based on National Geodetic Vertical Datum of 1929 (NGVD). Hydrologic and hydraulic models were developed for the main stem of Mattawoman Creek, Timothy Branch, Piney Run, and Old Woman's Run for present and future conditions. The headwaters tributaries initially included in the study were found to be too small to develop flood plain areas truly independent of the

Mattawoman main stream during the 24-hour 100-yr storm. During intense localized storms they are prone to flash flooding. The lower reaches of these tributaries were included within the main stream flood plain.

Water surface profiles were computed with the Corps of Engineers Water Surface Profile Program HEC2. All bridges and culverts were considered in developing the water surface profiles. SCS Hydrologic Model TR-20 was used in establishing flood peaks for various recurrence intervals for present and future conditions. Hydrologic parameters for the present and future were estimated using land use, zoning maps, and soil survey maps as well as information from the counties' planning and zoning departments, and the counties' master plans of expected future land use patterns for the period 1990-2000. Since the stream gage on Mattawoman Creek is now discontinued, it is presently an ungaged stream. A special study by SCS and the National Weather Service (NWS) determined rainfall depths to use in the SCS Hydrologic Model TR-20 to estimate the discharges associated with various recurrence intervals.

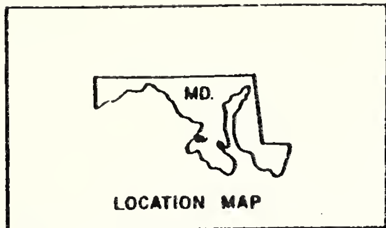
Since the Flood Insurance Study, with detailed mapping at a larger scale will be available in a reasonable time, it would be redundant to produce independent mapping of similar quality for this study. The 100-year flood line was mapped on U.S.G.S. 7½ minute topographic quad sheets, at a scale 1 inch equals 2,000 feet with contour intervals of 10 and 20 feet (Appendix A). Cross-section locations are noted on the maps. The principal products of this report are the profiles that accompany the maps and the tabular listing of discharges and elevations for the 500, 100, 50, 10, and 2-year floods (Appendix B). Detailed maps will be available from FEMA (Curtis Building, 6th and Walnut Streets, Philadelphia, PA. 19106 (phone 215-597-9581)) after 1983.

STUDY AREA DESCRIPTION

Introduction

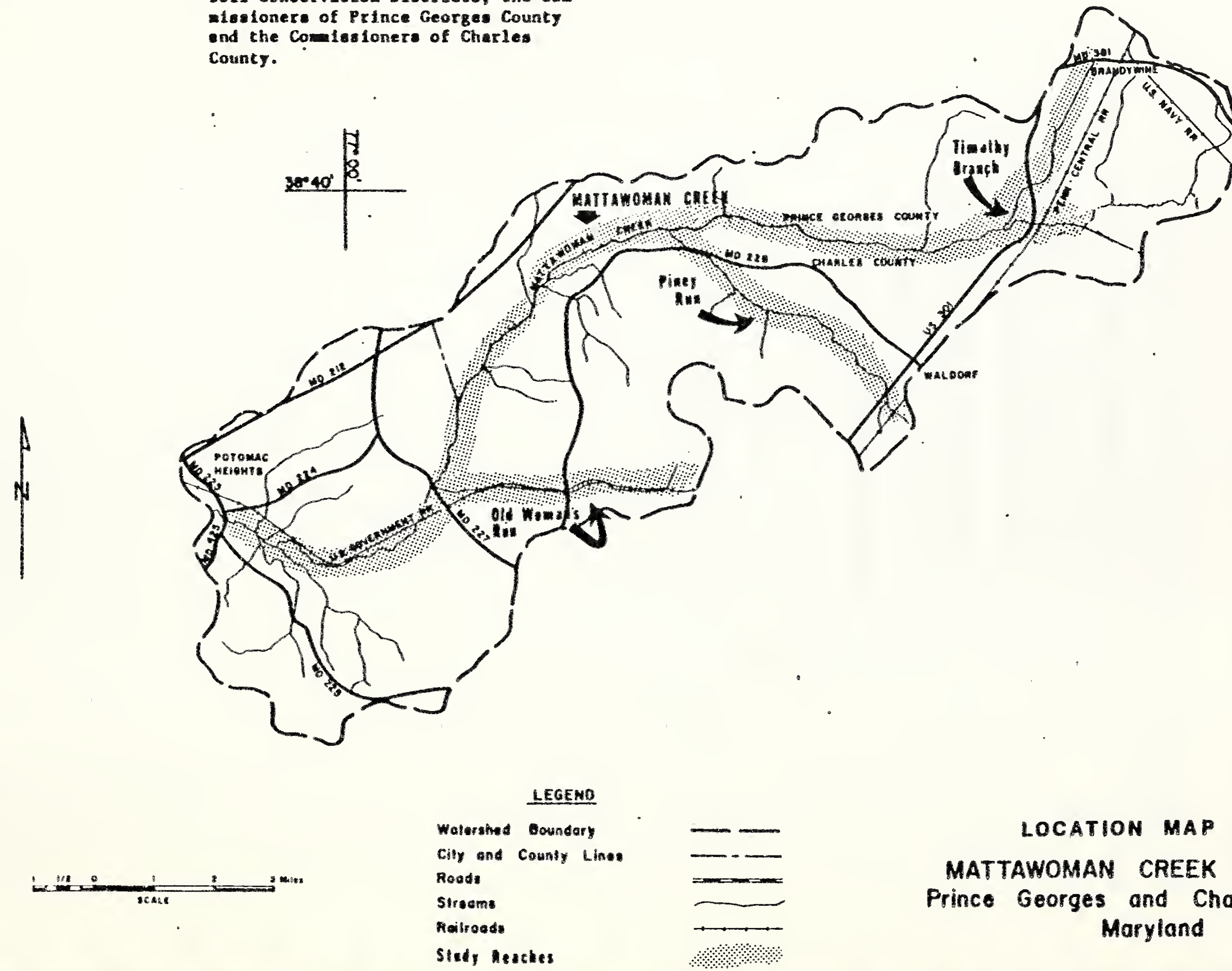
The Mattawoman Creek watershed is located in south central Maryland and covers about 50,500 acres in Prince George's and Charles Counties, Maryland (see Figure 1, Location Map). The study covers the freshwater part of the watershed above the legal tide limit. The watershed shape is elongated, and about 10 percent of the drainage area is marsh and flood plain. It lies within commuting distance of Washington, D.C. and satellite metropolitan, commercial and business centers; therefore it is subject to intensive pressure for suburban development.

The area studied includes the flood plain of Mattawoman Creek and its tributaries: Timothy Branch, Piney Run, and Old Woman's Run for a total of 32.6 miles. (See Figure 1).



Location Map of the Mattawoman Creek Watershed as taken from U.S.G.S. Maps of the area.

This watershed lies totally within Prince Georges and Charles Counties, Maryland, and is within the jurisdiction of Prince Georges and Charles Soil Conservation Districts; the Commissioners of Prince Georges County and the Commissioners of Charles County.



LOCATION MAP

MATTAWOMAN CREEK WATERSHED
Prince Georges and Charles Counties, Maryland

STUDY REACHES: MATTAWOMAN CREEK & TRIBUTARIES FLOODPLAIN MANAGEMENT

Stream	Length of Reach	Beginning of Reach	End of Reach
Mattawoman Creek	19.9 miles	Cedarville St. Forest	Mason Springs Tidal Limit
Timothy Branch	3.2 miles	Brandywine Road	Confluence
Piney Run	5.0 miles	Route 301	Confluence
Old Woman's Run	4.5 miles	Billingsley Road	Confluence

The width of the study area is approximately 2,000 feet on each side of the streams. The United States Geologic Survey hydrologic unit number for the study area is 02070011.

The study area has a humid continental climate with an average 47 inches of precipitation and a mean 56° F temperature annually. Maximum rainfalls occur in the summer (due to thunderstorms and hurricanes), although rain is fairly evenly distributed through the year. The growing season averages about 190 days between mid-April and mid-October. Mattawoman Creek lies in the partly dissected uplands of the Atlantic Coastal Plain physiographic province. Unconsolidated sands, gravels, silts and clays underlie the area, and are the parent materials for its soils. The major soils series are the Beltsville, Sassafras, and Bibb Series. The substrata are quite erodible when exposed.

Natural Values

In 1970, approximately 60 percent of the watershed was wooded and about 30 percent was in agricultural use with the remainder in surburban or urban land uses. There are about 275 farms in the watershed, averaging 125 acres in size, producing corn, tobacco, soybeans, and speciality crops.

The flood plain area is about 5,000 acres. Fifty percent of the flood plain is seasonally flooded, 45 percent is occasionally flooded bottomland hardwood and wooded swamp, 4 percent is in open space and 1 percent in other uses. There are few areas of prime farmland in the flood plain, and those present occur as isolated patches (See Appendix A). Some 1500 acres of prime farmland occur throughout the watershed.

The streams support moderately high populations of bluegill, largemouth bass, pickerel, catfish, white perch and suckers. The lower reaches of the main stem also support moderate to high populations of striped bass and herring during the spawning runs and provide an important nursery area for striped bass.

Wildlife species and habitat are of excellent to moderate numbers and quality. The area is used as resting and feeding grounds for diving and dabbling ducks, geese, whistling swans, and other migratory game such as mourning dove and woodcock. Wood ducks and herons have established breeding grounds. The relatively wide bottomland contains extensive wetlands, approximately 5,000 acres of Type 1 seasonally flooded basins or flats which are dominated by hardwoods and Type 7 wooded swamps. Deer, gray squirrel, cottontail rabbit, and bobwhite quail use the area year round. Furbearers such as the red and gray fox, raccoon, opposum, striped skunk, muskrat, otter, mink, and beaver; as well as shorebirds, waders, songbirds, and birds of prey (including the osprey) are present.

The Myrtle Grove Wildlife Management Area covers 834 acres in the southwestern part of the watershed near Route 225 (see Figure 2). The Department of Natural Resources manages the area for the benefit and production of fish and game as well as for non-game species. Hunting and fishing are both allowed in the area and there are facilities or opportunity for hunting, fishing, hiking, horseback riding, photography, birdwatching, and natural food collecting.

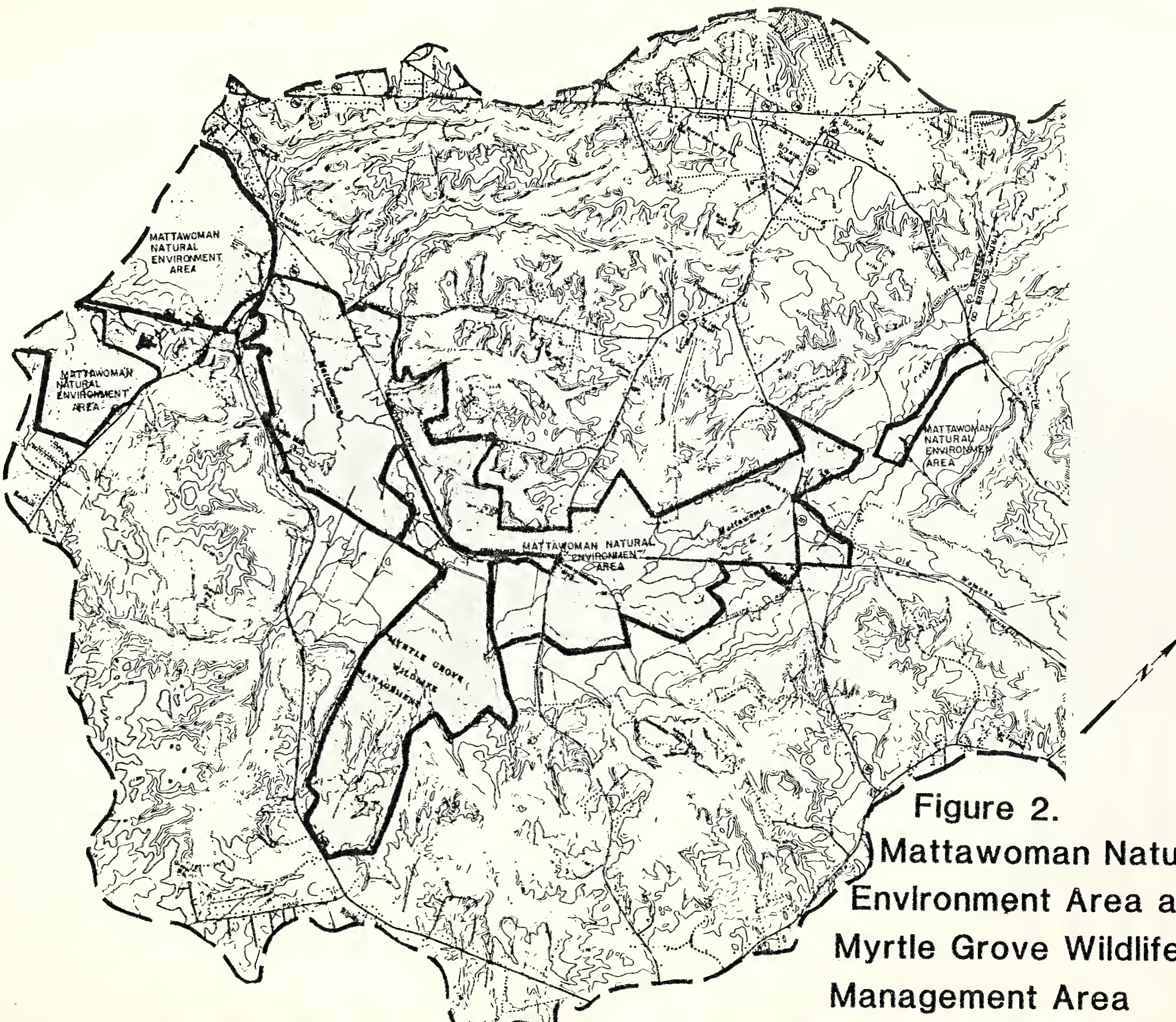


Figure 2.
Mattawoman Natural Environment Area and Myrtle Grove Wildlife Management Area

The Maryland Department of Natural Resources has acquired 2,154 acres partly within the watershed as part of the Mattawoman Natural Environment Area, a parkland project to preserve the natural features of the area and provide an undisturbed outdoor experience for Maryland's citizens. Hiking, biking, and bridle trails are proposed (see Figure 2).

Part of the Cedarville State Forest is in the eastern uplands of the watershed.

Flood Problems

In the past flood losses have been relatively minor due to limited development in the flood plain. At present most of the 5,000 acres inundated by the 100 year flood are woodland or wetland, approximately 4 percent or 200 acres is cropland or open space, and 5 percent or about 250 acres are developed or zoned for development. The major streams are not prone to flash flooding but rise slowly enough to give adequate warning of danger.

Flood damages occur to buildings, bottomland fields, low-lying roads, and bridges and amount to $5,000 to $10,000 in average annual damages. Low-lying parts of the Pinefield and Country Club South developments (located in Charles County east of Route 301 and south of the Mattawoman main stem) have experienced flooding, but major towns or communities as a whole have not been affected.

Flooding of residences and outbuildings occurred at Buteaux Crossing, a horse farm north of Berry Road, and near Bealle Hill Road during tropical storm Agnes (June 1972) and Hurricane Eloise (September 1979).

Severe thundershowers occurred on May 30, 1982, with rains locally exceeding the 100-year storm. Flooding in Pinefield and Country Club South affected 17 houses and 30 vehicles, with widespread yard and street flooding. Although most residents had alternative routes for access, several cul-de-sacs were isolated by the waters.

The watershed is in a rapid growth area near Washington, D.C. The major community is Waldorf which is located partly within the watershed near the eastern boundary. Waldorf's 1970 population of 13,607 increased to 24,460 in 1980. Most residents work outside the watershed, and a half-dozen single family house type subdivisions have grown up amongst existing rural centers and crossroad communities. The new interceptor sewer line along the creek will encourage further development.

The counties' planning and zoning maps indicate a future increase in three acre to 1/3 acre lot zones (especially in Charles County) where presently a mix of open land, cropland, woods and pasture covers about sixty percent of the watershed. Future condition flood stages and peak flows were calculated assuming these zones to reflect actual land use changes.

Transition from rural to urban land uses will increase the frequency of flooding in the study area. Runoff from a given rainfall will have increased volume due to larger percentages of impervious area (roofs, roads, parking lots) and the time of the concentration will decrease due to changed hydrologic characteristics of the drainage area. This larger runoff will result in increased erosion, sedimentation, and flood damages.

Existing Flood Plain Management

On the state level, within the Water Resources Administration the Flood Management Division provides technical assistance to local governments for watershed planning in the implementation of the Flood Hazard Act of 1976 (Natural Resources Article 8-9A01 (et seq.) This is the regulatory authority in the State for watershed planning. The Flood Management Division also coordinates at local and Federal level with the National Flood Insurance Program and provides information and education to public and private groups and individuals.

The State of Maryland code requires a permit whenever private activity changes in any manner, "the course, current, and cross section of any stream or body of water," within state waters (Code of Maryland, Natural Resources Article, Section 8-803). State waters are defined to include the flood plain of free flowing waters determined by the Department of Natural Resources on the basis of the 100-year flood.

Activities of the State of Maryland, Department of Planning relate primarily to overseeing land use activities statewide and offering advice and assistance so that land use changes which create a potentially serious flooding situation are avoided (Article 88C, Annotated Code of Maryland).

The Subdivision Regulations of the Charles County Code require that buildings constructed in the Regulatory (100-year) Flood Plain must be elevated to or above the level of the Regulatory Flood, or be adequately floodproofed. If the proposed development will lie in the Regulatory Floodway, or increase the Regulatory Flood height, it is not to be approved by the Planning Commission. (Subdivision Regulations Charles County Code, June 1976, P. 36).

Prince Georges County Bill 48-1981 CB-48-1981, (enacted October 6, 1981 and effective January 1, 1982) requires that in proposed subdivisions, lots contain the minimum lot area prescribed by the Zoning Ordinances exclusive of the 100 year flood plain as delineated by the Federal Insurance Administration or another appropriate public agency. Residences must be set back 25 feet from the flood plain boundary. If a lot contains the flood plain of a stream that is to be left substantially in its natural state and this flood plain is not to become a public park or recreation area, this flood plain becomes an easement area. It may be used if necessary for utility lines, storm drain facilities, open-type fencing, or passive recreation as long as there are no structures that would interfere with the flood conveyance capacity of the easement. Storm water management and sediment control plans are also required for proposed subdivisions. These plans must demonstrate adequate control by structural or non-structural means of increased runoff for the 10- and some times the 100-year storm and submit a storm drainage concept study prior to final plat approval. Land found unsafe due to flooding, erosive stream action, high water tables, unstable soils or severe slopes may not be subdivided. The Maryland National Capital Park and Planning Commission reviews all subdivision applications and rezoning requests for compatibility with the county and planning area comprehensive plans and flood plain conservation is a part of the master plans.

The county building code prohibits the construction or placing any structures or obstructions in the 100-year flood plain, and also filling or changing the cross section or flow characteristics within this flood plain.

Residents of a subdivision located in the flood plain at one community were relocated and the land has been converted to open space.

ALTERNATIVES FOR FLOOD PLAIN MANAGEMENT

A. Present Condition (No Action)

This alternative would preserve the present state of affairs. Both Prince Georges and Charles Counties have non-structural flood plain management policies for the watershed at present. This study and the forthcoming FIA study will provide a delineation of the 100-year flood plain.

B. Land Treatment

Land treatment measures would reduce runoff somewhat, but they would not significantly reduce flood peaks, especially in the eastern half of the watershed where most of the development is occurring. Flood plain scour and some small scale gullying presently occurs on the sewer right-of-way in the Mattawoman flood plain (see Figure 5, Appendix D). Erosion of idle and poorly managed farm land and streambank erosion during floods also occur but the major erosion sources in the watershed are from the continuing urbanization taking place. The eroded soil silts valley lands, and obstructs storm sewers, road ditches, and the natural channels.

Conservation land treatment measures, the use of effective erosion and sediment control practices on disturbed soils and development sites, and critical area treatment for trouble spots can reduce erosion and sedimentation.

C. Preservation of Natural Values

In 1969 the Maryland General Assembly authorized the creation of the Mattawoman Natural Environmental Area and in September 1974, Secretary Coulter of the Maryland Department of Natural Resources approved project boundaries encompassing 4730 acres which included Mattawoman Creek, flood plain and upland acres from Marbury (downstream of this study's limits) to Billingsley Road. The open space program has been authorized to purchase 3,061 acres for the Natural Area. They have acquired 2,154 acres by purchase or easement to date. The land is adjacent to the Myrtle Grove Wildlife Area (see Figure 2).

There is some concern among watershed residents that the proposed natural area may be usurped by development or damaged by excessive siltation from eroding construction sites. With appropriate zoning and enforcement of the present sediment control program operating on adjacent acres, it would be possible to maintain the Natural Environmental Area in a relatively wild and undeveloped state.

D. Non-Structural Measures

Flood plain delineation can provide the sponsors with an effective tool for flood plain management along with the application of some non-structural measures.

Floodproofing with low walls, flood doors and windows, could protect individual properties such as those at Buteaux Crossing, at the Harris-Middleton Road Crossing, and the farm north of Rt. 228 from flooding below specified elevations.

Another option would be to raise affected structures, such as the barn on the horse farm mentioned previously or main family residences which have the necessary structural integrity. Physical relocation of presently flooded structures, especially outbuildings, to higher ground is another alternative.

Relocation in which the landowner actually moves to another location is another management alternative, which could be combined with a program of flood plain purchase by the state or county. Flood plain management can also be done through local and county zoning ordinances, building codes, community planning, and the permits systems. Legal restrictions on construction and land use in the flood plain can be a powerful tool for controlling future flood plain uses if they are strongly enforced.

Flood insurance will also be available to interested property owners if Charles County decides to join the regular program. The flood elevations given here and the detailed mapping to be available through the flood insurance study are tailored for this program.

Since damages in the watershed are somewhat scattered, it may well be that a combination of non-structural measures would provide the best protection to those now receiving damages. A strong zoning code and its enforcement could keep inappropriate land uses out of the flood zone in the future.

The Prince Georges County regulations and codes governing flood plain land use are quite detailed and the county's management program is innovative and active. The Charles County Commissioners may not wish to adopt similar management measures for the whole county, but establishing similar management measures and a comparable enforcement program for the Mattawoman would provide a consistent land use policy in the watershed.

E. Structural Measures

Sandbars choke the streams, and create particular hazards at road crossings and culverts where fallen trees and debris may jam and trap even more sediment (see Figure 7, Appendix D). These conglomerations increase the flooding problem by backing up water during high flows.

The channel can be cleared of fallen trees and debris dams to improve channel capacity and reduce some flooding.

Stormwater management ordinances usually require developers to install stormwater controls that maintain present runoff levels or increase future runoff by no more than a specified amount. Such controls could be structural (detention ponds, levees, roof-top detention facilities), non-structural (porous pavements, minimum use of natural drainages, infiltration pits, increased open space) or some appropriate combination of these. An effective program could reduce the expected levels of flooding in the future.

A system of dikes could provide flood protection for some damageable properties. They would probably need to be 5 to 10 feet high and 1,000 to 3,500 feet long and either surround the property or form a barrier to the river depending on the individual case. The economic feasibility of dikes was not evaluated, but it is very likely that one dike would have to provide protection to several properties before it became economically justifiable.

Ten potential structure sites were identified in the Mattawoman Creek Watershed by the Water Resources Inventory (SCS, 1968). These are located on tributaries or headwater streams. Several of the larger site areas have since been usurped by development nearby. The remaining potential sites are small and would do little towards actual flood reduction. Because of these minimal benefits and the high cost of such structures, there is very little likelihood of their economic justification.

FLOOD BOUNDARY MAPS

Three map sheets showing the 100-year floodplain of Mattawoman Creek are published as Appendix A of this report. The base map is a mosaic of U.S.G.S. 7½ minute topographic quadrangles at 1 inch to 2,000 feet, with contour intervals at 10 and 20 feet. Cross-section locations are marked and the maps can be used with the profiles that accompany them to determine the elevations of various frequency floods at points within the watershed. The location of prime farmland soils within the floodplain is also shown.

These floodplain maps will be superseded by those in the Flood Insurance Study. As the future maps will be more detailed, it is not expected that the floodplain delineations will exactly agree, but that does not affect the elevations published in this report upon which the FIS maps will be based.

To utilize the information in Appendix A (Maps and Profiles) and Appendix B (elevations tables), one should locate a point of interest on the map, and then find the nearest cross-section. Reference to the tables at that cross-section will give the elevations of the various floods. Measuring up or down stream on the profiles from the cross-section an appropriate distance will give an estimate of flood levels at points between the sections.

Several cross-sections and bridges are plotted in Appendix D, showing the general channel shape, and some of the smaller side channels characteristic of the floodplain. Flood elevations are also shown on the plots indicating the water level during various flood flows. Photographs are included in Appendix D, with the flood levels also shown.

GLOSSARY OF TERMS

cfs - Cubic feet per second (unit of discharge).

cross-section - Shape and dimensions of a channel and valley perpendicular to the line of flow.

discharge - Rate of water flow, expressed in cubic feet per second (cfs).

elev. - bridge deck - Elevation of a roadway across a bridge or culvert.

elev. - low beam - Elevation of lowest structural "beam" that limits the height of the bridge opening; or may indicate the top of a culvert opening.

elev. low road - Elevation of low point on a roadway approaching or crossing a bridge or culvert.

flood - A overflow of lands not normally covered by water; a temporary increase in streamflow or stage; or the discharge causing the overflow or temporary increase.

flood frequency - An expression of how often a flood of given magnitude can be expected. (Note: The word "frequency" often is omitted to avoid monotonous repetition.)

Examples

10-year flood or 10-year frequency flood - The flood which can be expected to be equalled or exceeded on an average once in 10 years; and which would have a 10 percent chance of being equalled or exceeded in any given year.

50-year flood - . . . . two percent chance . . . . in any given year.
100-year flood -. . . . one percent chance . . . . in any given year.
500-year flood -. . . . two-tenths percent chance . . . . in any given year.

flood peak or peak discharge - The highest stage or discharge attained during a flood.

flood plain or flood-prone area - Lands adjoining a stream (or other body of water) which hs been or may be covered with water.

flood profile or profile - A plotted line showing the highest water surface elevations along a stream during a particular flood.

flood-prone area - See flood plain.

flood routing - Computation of the changes in the rise and fall in stream flow as a flood moves downstream. The results provide hydrographs of discharge versus time at given points on the stream.

frequency-discharge curve - A plotted line showing the frequency of various flood discharges at a surveyed cross-section or other point along a stream. (Used with a stage-discharge curve to determine the high water elevations resulting from selected flood discharge at the point on the stream.)

hydrograph - A plotted curve showing the rise and fall of flood discharge with respect to time at a specific point on a stream.

land use - Classification of type of vegetation, or other surface cover conditions on a watershed used (with a similar classification of soils) to indicate the rate and volume of flood runoff.

peak discharge or flood peak - The highest rate of runoff (discharge) attained during a flood.

profile - See flood profile.

runoff - That portion of the total storm rainfall flowing across the ground or other suface and contributing to the flood discharge.

stage-discharge curve - A plotted curve showing elevations resulting from a range of discharges at a surveyed cross-section, stream gage, or other point on a stream.

watershed - A drainage area which collects and transmits runoff to the outlet of the drainage basin.

water surface profile - See flood profile.

BIBLIOGRAPHY

Inter-Office Memo (unofficial), Charles County Department of Public Works and Charles County Commissioners on Storm of May 30, 1982, dated June 22, 1982.

Kusler, J. A. Innovation in Local Floodplain Management: A Summary of Community Experience, Naturaal Hazards Research and Applications Information Center, Special Publication 4, Boulder, Colorado, 1982.

U.S. Department of Agriculture, Soil Conservation Service, Cartographic Unit: Mosaic prepared from USGS topo quads, 1979.

U.S. Department of Agriculture, Soil Conservation Service, National Engineerine Handbook, Volumes 4: Hydrology (1972) and Volume 5: Hydraulics (1951).

U.S. Department of Agriculture, Soil Conservation Service, Technical Release 20, Computer Program for Project Formulation, Hydrology, Washington, D. C.; (1965).

U.S. Department of Agriculture, Soil Conservation Service, Technical Release 61, WSP Computer Program, Washington, D. C., 1976.

U.S. Army Corps of Engineers, Hydrologic Engineering Center, Computer Program 723-X6-L202A (1976, updated April 1980) and HEC-2 Water Surface Profiles Users Manual, Davis, California, August, 1979.

U.S. Department of Commerce, NOAA, Climatological Summary: LaPlata, Maryland, 1970.

NWS, Five to 60-Minute Precipitation Frequency for Eastern and Central United States, 1977.

U.S. Department of Interior, Geological Survey, Brandywine, Maryland (N8375 - W7645/7.5; 7.5 Minute Topographic Quadrangle series): Washington, D. C., 1956 (revised 1971).

U.S. Department of Interior, Geological Survey, Hughesville, Maryland. (N 3830 - W7645/7.5; 7.5 Minute Topographic Quadrangle series): Washington, D. C., 1956 (revised 1974).

U.S. Department of Interior, Geological Survey, Piscataway, Maryland. (N3837.5 - W76525; 7.5 Minute Topographic Quadrangle series): Washington, D. C., 1957 (revised 1978).

U.S. Department of Interior, Geological Survey, Mounty Vernon, Md-Va. (N3839-5 - W7700/7.5; 7.5 Minute Topographic Quadrangle series): Washington, D. C., 1966 (revised 1978).

U.S. Department of Interior, Geological Survey, Water Resources Data for Maryland and Delaware, 1955, 1972, 1975, 1979.

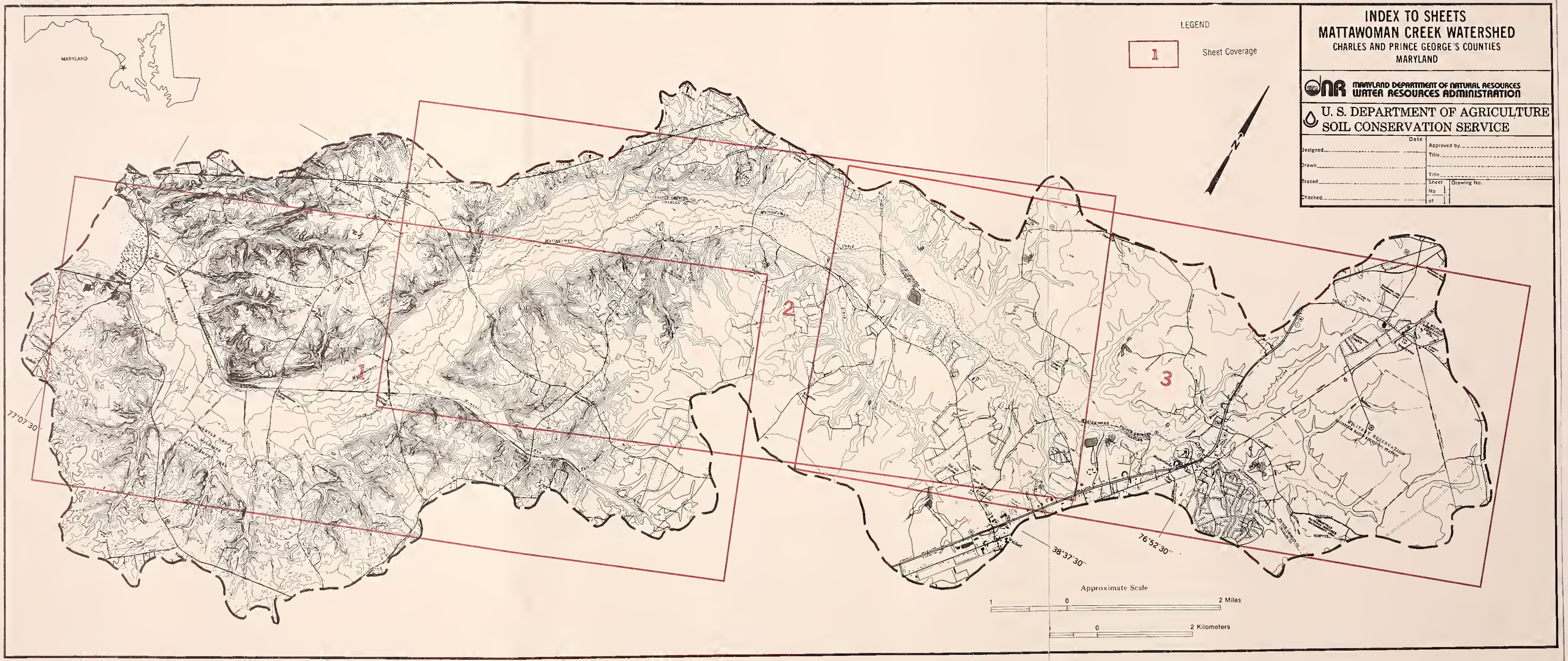
U.S. Water Resources Council, Bulletin 17A: Guidelines for Determining Flood Flow Frequency, U.S. Government Printing Office, June 1977.

APPENDIX A:

FLOOD PLAIN MAPS AND PROFILES

NOTE TO APPENDIX A

The tabulated present and future condition profiles in Appendix B are the source of the profiles in this Appendix and come directly out of the HEC2 Computer Models. Since the distances between some cross-sections are quite short, especially those located near bridges, not all of the cross-sections used in the model are shown on the maps and profiles. They are listed in Apendix B. The computer model, input and complete output are stored at the Flood Plain Management Division of the Water Resources Administration in Annapolis (telephone 301-269-3825). The Soil Conservation Service in College Park (telephone 301-344-4180) has copies of the model input and summarized output for reference, and copies of this document for distribution. Information from the models is available to the public upon request and should be referred to if the data are to be used to determine a flood height at a specific location.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WATER RESOURCES ADMINISTRATION
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SOIL CONSERVATION SERVICE
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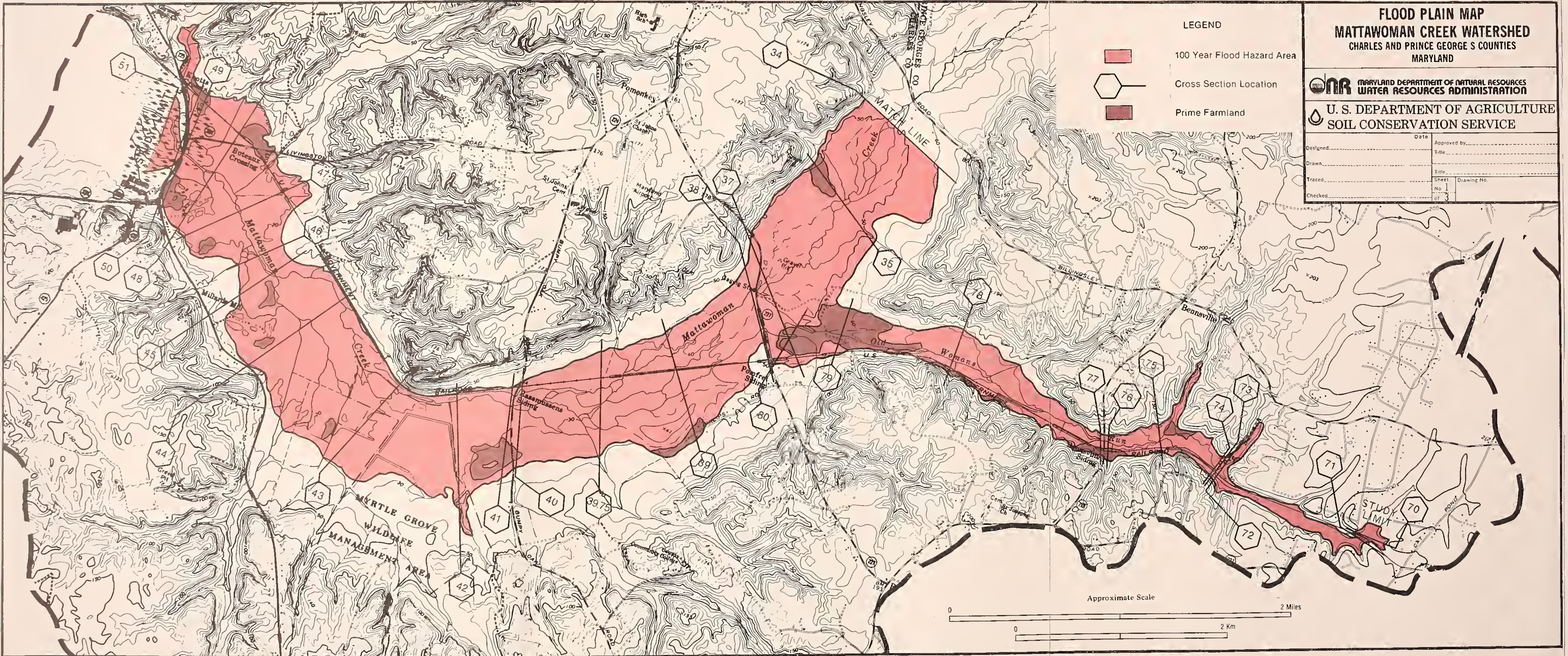
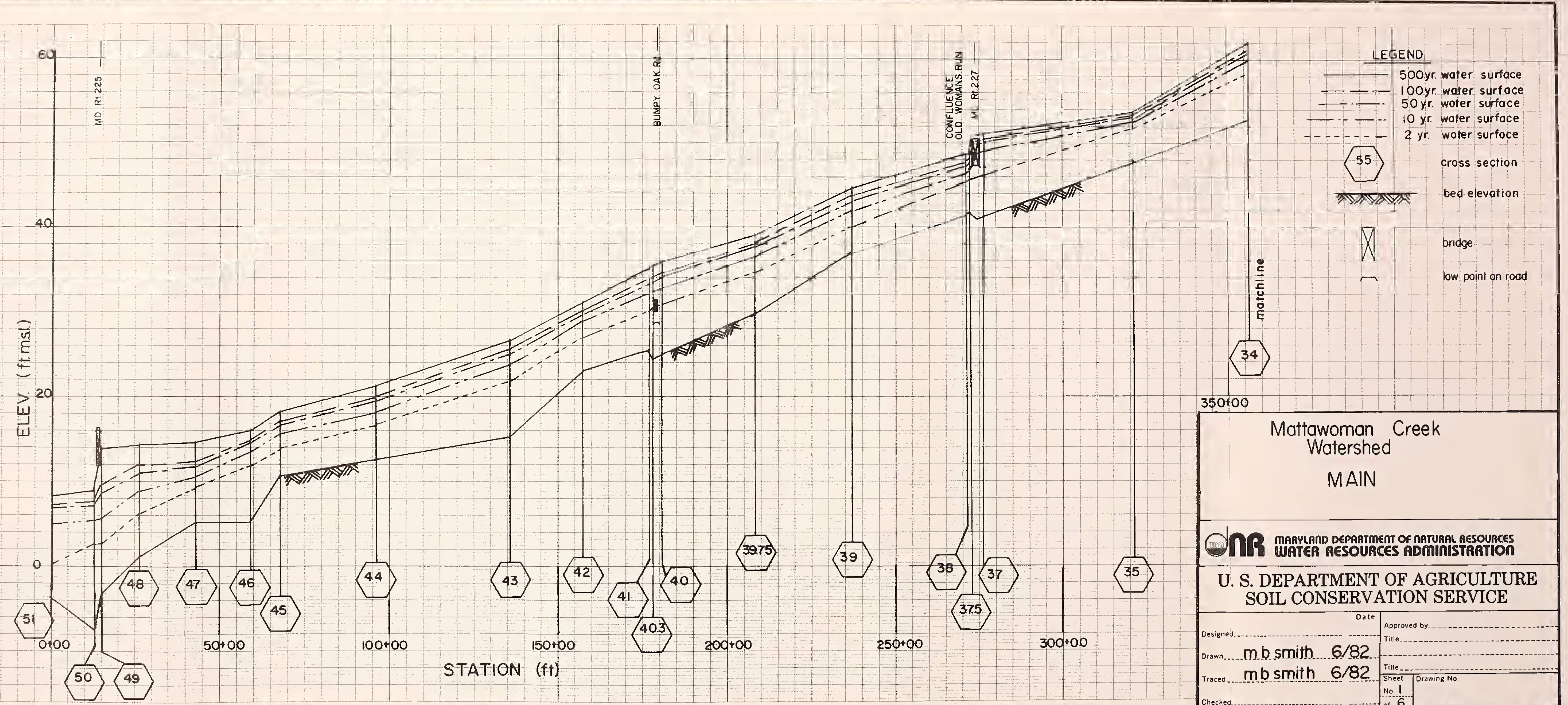

FLOOD PLAIN MAP
MATTAWOMAN CREEK WATERSHED
CHARLES AND PRINCE GEORGE S COUNTIES
MARYLAND
MARYLAND DEPARTMENT OF NATURAL RESOURCES
WATER RESOURCES ADMINISTRATION
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
LEGEND
100 Year Flood Hazard Area
Cross Section Location
Prime Farmland
Sheet No. 1 of 3
Approximate Scale
0
2 Miles
0
2 Km
Mattawoman Creek
Old Womans Run
MYRTLE GROVE WILDLIFE MANAGEMENT AREA
STUDY LIMIT
MATCH LINE
Bennsville
Pomonkey
Poofret Siding
Rasmussens Siding
Buteaux Crossing



Mattawoman Creek Watershed

MAIN

MARYLAND DEPARTMENT OF NATURAL RESOURCES
WATER RESOURCES ADMINISTRATION

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date	
Designed		Approved by
Drawn m b smith	6/82	Title
Traced m b smith	6/82	Title
Checked		Sheet No. 1 of 6 — Drawing No.

Mattawoman Creek Watershed

Old Woman's Run

MARYLAND DEPARTMENT OF NATURAL RESOURCES
WATER RESOURCES ADMINISTRATION

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

		Date	
Designed			Approved by
Drawn	mb smith	6/82	Title
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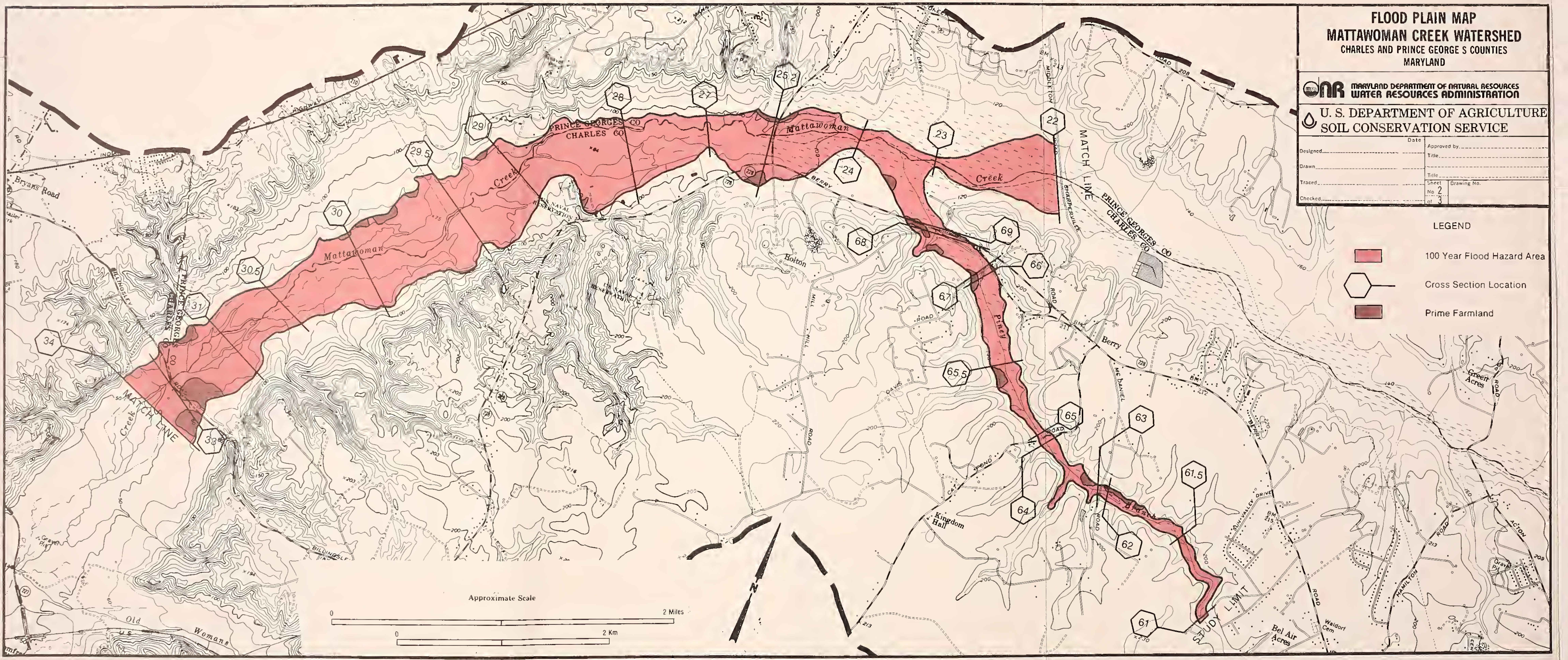
Checked			Sheet No. 2 of 6 — Drawing No.


FLOOD PLAIN MAP
MATTAWOMAN CREEK WATERSHED
CHARLES AND PRINCE GEORGE S COUNTIES
MARYLAND
MARYLAND DEPARTMENT OF NATURAL RESOURCES
WATER RESOURCES ADMINISTRATION
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Designed
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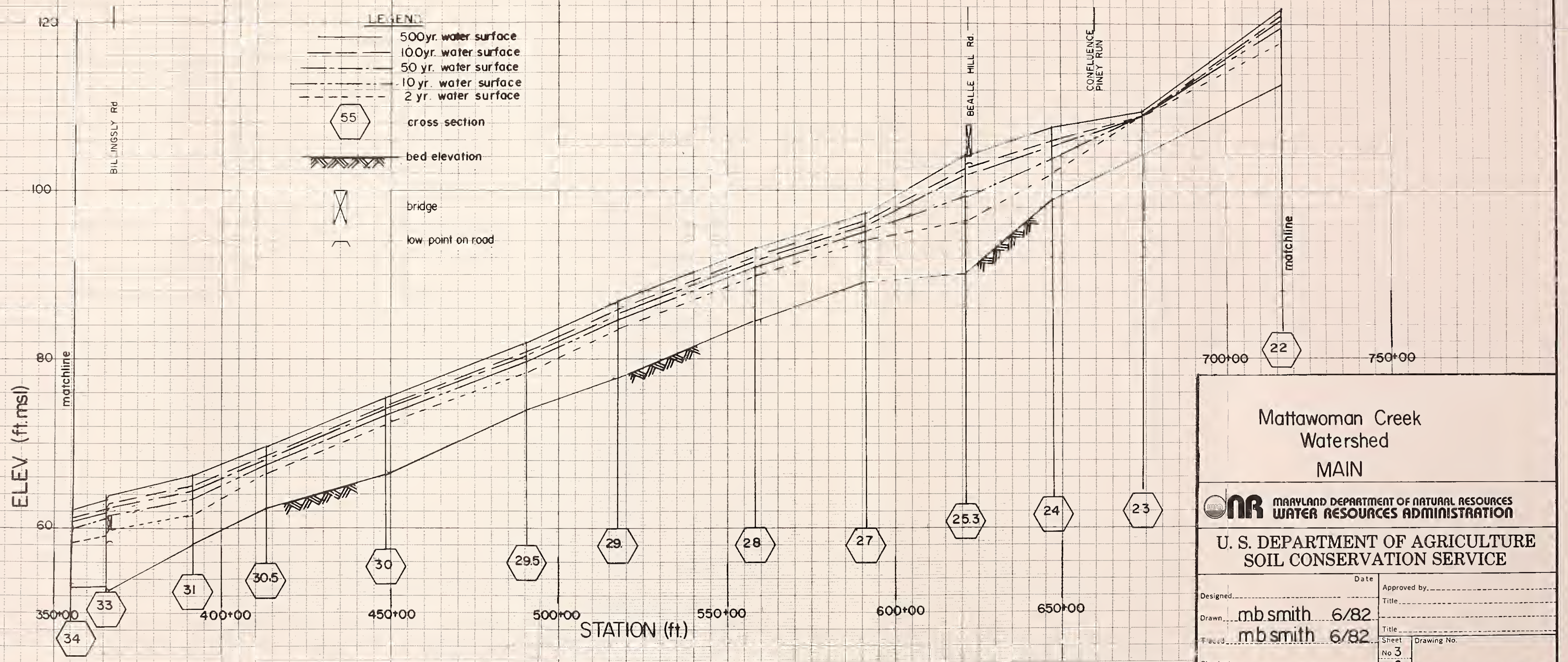
Date
Approved by
Title
Sheet No. 2 of 3
Drawing No.
LEGEND
100 Year Flood Hazard Area
Cross Section Location
Prime Farmland
Approximate Scale
0
2 Miles
0
2 Km
MATCH LINE
PRINCE GEORGES CO
CHARLES CO
Mattawoman Creek
Piney Branch
Bryans Road
Holton
Berry
Kingdom Hall
Bel Air Acres
Green Acres
Waldorf Cem
STUDY LIMIT
Old Womans
22
23
24
25.2
27
28
29
29.5
30
30.5
31
33
34
61
61.5
62
63
64
65
65.5
66
67
68
69



Mattawoman Creek
Watershed
MAIN

MARYLAND DEPARTMENT OF NATURAL RESOURCES
WATER RESOURCES ADMINISTRATION

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date	
Designed		Approved by
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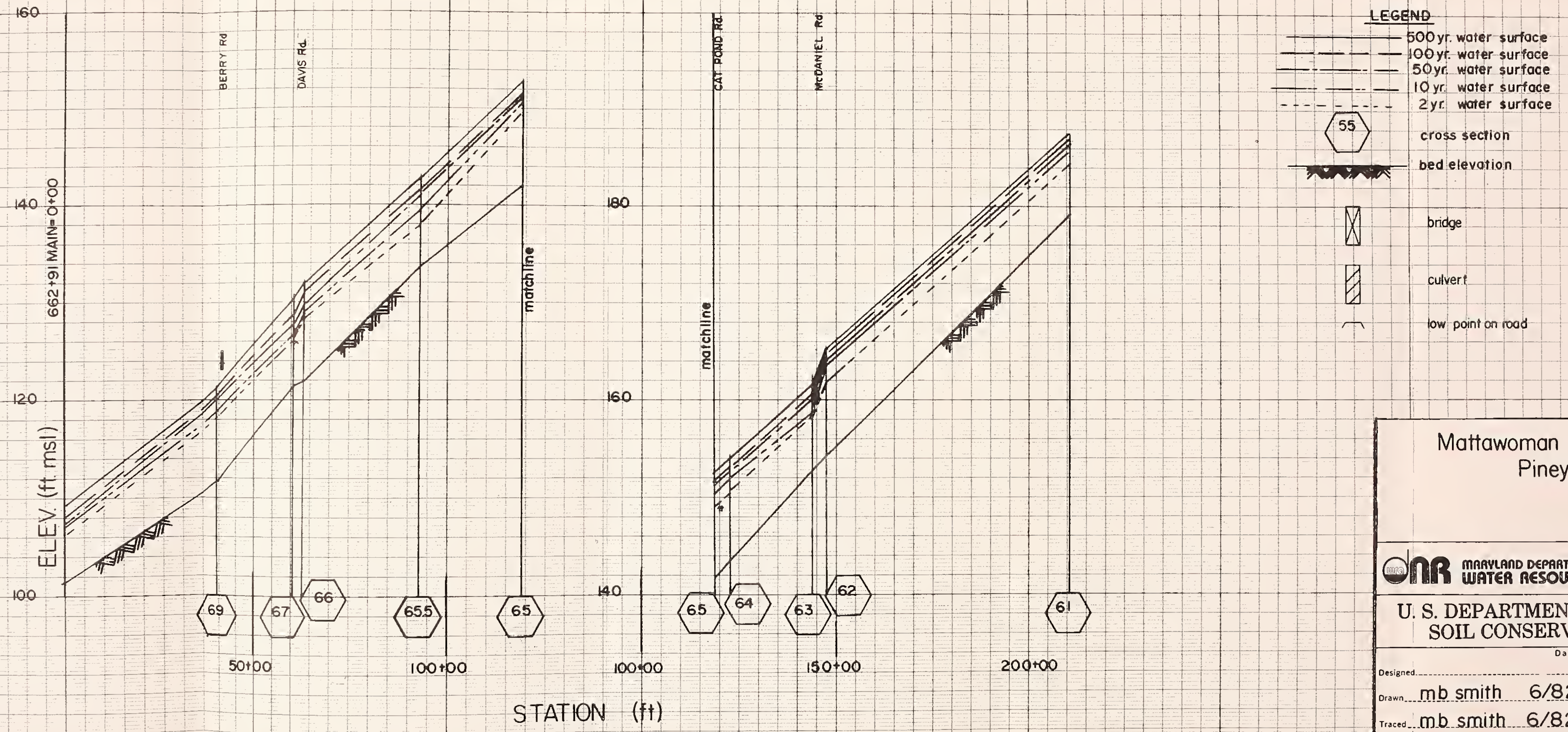
Traced mb smith	6/82	Title
Checked		Sheet No 3 of 6 / Drawing No.

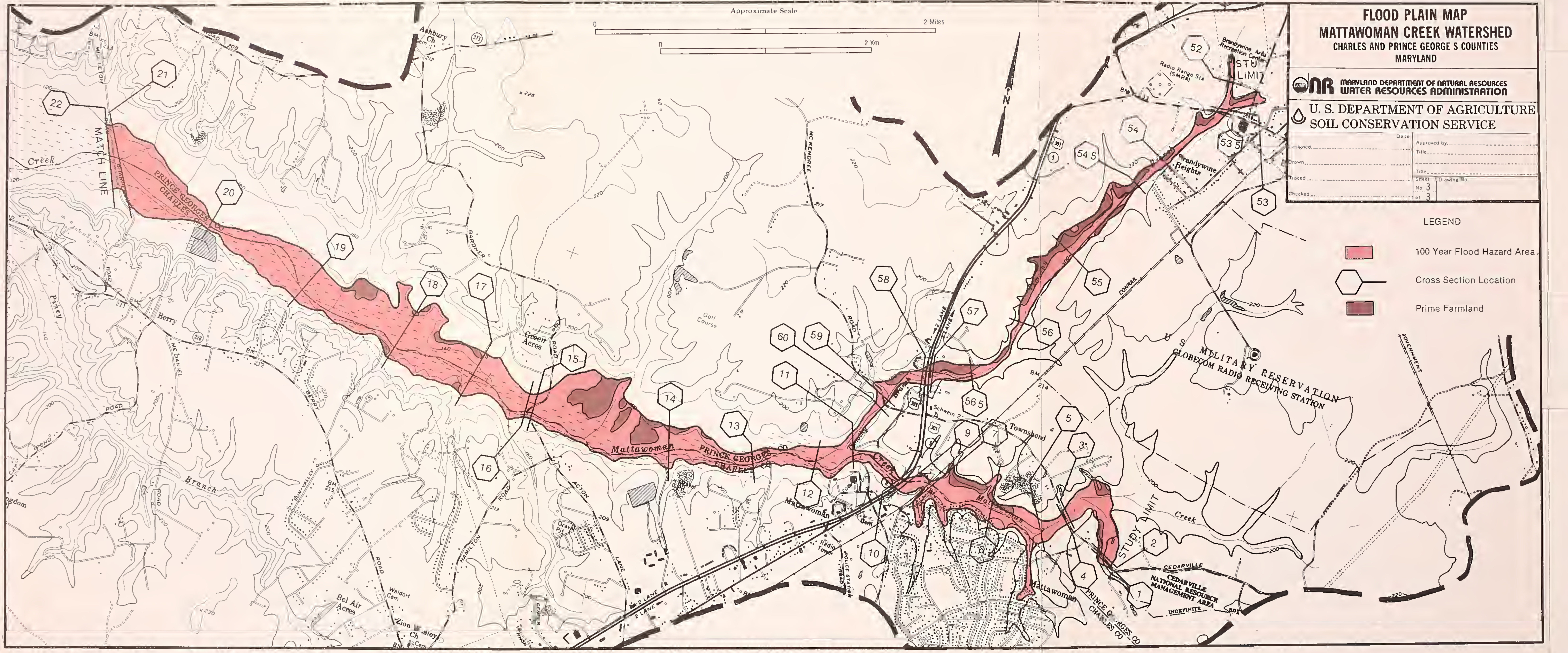


Mattawoman Creek Watershed
Piney Run

MARYLAND DEPARTMENT OF NATURAL RESOURCES
WATER RESOURCES ADMINISTRATION

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

		Date	
Designed			Approved by
Drawn	mb smith	6/82	Title
Traced	mb smith	6/82	Title
Checked			Sheet No 4 of 6 — Drawing No.


FLOOD PLAIN MAP
MATTAWOMAN CREEK WATERSHED
CHARLES AND PRINCE GEORGE S COUNTIES
MARYLAND
MARYLAND DEPARTMENT OF NATURAL RESOURCES
WATER RESOURCES ADMINISTRATION
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Sheet No 3 of 3
Approximate Scale
2 Miles
2 Km
LEGEND
100 Year Flood Hazard Area
Cross Section Location
Prime Farmland
MATCH LINE
PRINCE GEORGES CO
CHARLES CO
Mattawoman
U S MILITARY RESERVATION
GLOBECOM RADIO RECEIVING STATION
STUDY LIMIT
CEDARVILLE NATIONAL RESOURCE MANAGEMENT AREA
Brandywine Heights
Golf Course
Green Acres
Bel Air Acres
Townshend
Berry

LEGEND
500 yr. water surface
100 yr. water surface
50 yr. water surface
10 yr. water surface
2 yr. water surface
55 cross section
bed elevation
bridge
culvert
low point on road
SHARPERVILLE Rd
matchline
ACTON Rd
CONFLUENCE TIMOTHY BRANCH
US Rt 301
PENN RR
McKENDREE Rd
CEDARVILLE Rd
ELEV. (ft. msl)
STATION (ft)
180
160
140
120
200
180
160
140
120
160
700+00
750+00
800+00
850+00
900+00
950+00
1000+00
1050+00
1100+00
22
20
19
18
17
16
14
13
12
11
10
72
6
5
4
3.2
2
1
Mattawoman Creek Watershed
MAIN
MARYLAND DEPARTMENT OF NATURAL RESOURCES
WATER RESOURCES ADMINISTRATION
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Date
Designed
Drawn mb smith 6/82
Traced mb smith 6/82
Checked
Approved by
Title
Title
Sheet No 5 of 6
Drawing No.

Mattawoman Creek Watershed
Timothy Branch

MARYLAND DEPARTMENT OF NATURAL RESOURCES
WATER RESOURCES ADMINISTRATION

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date	
Designed		Approved by
Drawn m.b.smith	6/82	Title
Traced m.b.smith	6/82	Title
Checked		Sheet No 6 of 6 — Drawing No

APPENDIX B:

FLOOD ELEVATIONS AT SELECTED FREQUENCIES

DISCHARGES AND WATER SURFACE ELEVATIONS FOR SELECTED FLOW FREQUENCIES

Cross-	500 year		100 year		50 year		10 year		2 year	
Section	Q (cfs)	El. (ft)	Q (cfs)	El. (cfs)	Q (cfs)	El. (ft)	Q (cfs)	El. (ft)	Q (cfs)	El. (ft)
MATTAWOMAN CREEK, PRESENT CONDITIONS										
51	20274	8.2	12744	7.3	10002	7.0	5008	4.0	1299	0.2
50	19841	8.7	12500	7.5	9808	7.2	4870	5.5	1163	2.6
49.3	19841	11.0	12500	7.8	9808	7.3	4870	5.5	1163	2.6
49.2	19841	13.9	12500	8.2	9808	7.5	4870	5.6	1163	2.6
49	19841	13.9	12500	9.7	9808	8.6	4870	5.9	1163	2.6
48	19841	14.1	12500	11.8	9808	10.8	4870	9.0	1163	6.1
47	19809	14.5	12334	12.5	9620	11.8	4676	10.6	1062	9.5
46	19809	16.0	12334	14.9	9620	14.5	4676	13.7	1062	11.8
45	19809	18.1	12334	17.1	9620	16.7	4676	15.7	1062	14.4
44	19809	21.1	12334	19.9	9620	19.4	4676	18.2	1062	16.7
43	17094	26.6	11106	25.5	8916	25.0	4682	23.9	1132	21.8
42	17094	31.0	11106	30.1	8916	29.7	4682	28.7	1132	27.0
41	17094	35.0	11106	33.9	8916	33.4	4682	32.1	1132	30.0
40.3	16729	35.3	11070	34.2	8952	33.7	4672	32.4	1090	30.5
40.2	16729	35.3	11070	34.2	8952	33.7	4672	32.4	1090	30.5
40	16729	35.8	11070	34.7	8952	34.2	4672	32.8	1090	30.8
39.75	16729	39.2	11070	38.2	8952	37.7	4672	36.5	1090	34.8
39.5	16729	43.0	11070	42.2	8952	41.9	4672	41.1	1090	40.0
39	16729	44.5	11070	43.5	8952	43.1	4672	41.9	1090	40.1
38	16729	48.5	11070	47.6	8952	47.2	4672	46.4	1090	45.6
37.5	16729	48.9	11070	48.1	8952	47.8	4672	47.0	1090	45.8
37.4	16729	49.6	11070	49.2	8952	49.0	4672	47.0	1090	45.8
37.3	16729	50.9	11070	50.4	8952	50.1	4672	48.6	1090	45.9
37.2	16729	50.9	11070	50.4	8952	50.2	4672	49.0	1090	45.9
37	12431	51.1	8007	50.6	6528	50.3	3834	49.0	1102	46.3
35	12431	53.8	8007	53.4	6528	53.2	3834	52.8	1102	51.7
34	12431	62.1	8007	61.1	6528	60.7	3834	59.9	1102	58.3
33	12431	63.3	8007	62.3	6528	61.9	3834	61.0	1102	59.2
32.3	12431	63.4	8007	62.4	6528	62.0	3834	61.1	1102	59.2
32.2	12431	63.4	8007	62.4	6528	62.0	3834	61.1	1102	59.2
32.1	12431	63.8	8007	62.8	6528	62.4	3834	61.5	1102	59.6
31	12431	66.1	8007	64.9	6528	64.4	3834	63.4	1102	61.5
30.5	12431	69.4	8007	68.5	6528	68.1	3834	67.4	1002	66.3
30	12431	75.3	8007	74.5	6528	74.1	3834	73.4	1102	72.1
29.5	12431	81.8	8007	80.8	6528	80.4	3834	79.6	1102	78.3
29	12169	86.8	8140	85.9	6698	85.6	3761	84.7	1517	83.6

DISCHARGES AND WATER SURFACE ELEVATIONS FOR SELECTED FLOW FREQUENCIES (CON'T)

Cross-	500 year		100 year		50 year		10 year		2 year	
Section	Q (cfs)	El. (ft)	Q (cfs)	El. (cfs)	Q (cfs)	El. (ft)	Q (cfs)	El. (ft)	Q (cfs)	El. (ft)
MATTAWOMAN CREEK, PRESENT CONDITIONS (CONT'D)										
28	12169	93.0	8140	92.1	6698	91.7	3761	90.8	1517	89.8
27	12169	97.2	8140	96.3	6698	95.9	3761	95.0	1517	94.0
25.3	12169	104.1	8140	102.4	6698	101.5	3761	99.2	1517	96.4
25.2	12169	104.1	8140	102.5	6698	101.6	3761	99.2	1517	96.4
24	12169	107.6	8140	106.0	6698	105.3	3761	103.8	1517	102.0
23[1]	11096	109.5	7236	109.1	5843	109.0	3152	109.0	896	109.0
22	11096	121.7	7236	120.9	5843	120.5	3152	119.4	896	117.6
21.5	11096	121.8	7236	121.0	5843	120.6	3152	119.5	896	118.3
21.4	11096	121.8	7236	121.0	5843	120.6	3152	119.5	896	118.3
21.3	11096	121.8	7236	121.0	5843	120.6	3152	119.5	896	118.3
21.2	11096	121.8	7236	121.0	5843	120.6	3152	119.5	896	118.3
21	11096	121.9	7236	121.0	5843	120.7	3152	119.6	896	118.4
20	11096	127.1	7236	125.9	5843	125.6	3152	125.1	896	124.4
19	11096	137.2	7236	136.4	5843	136.0	3152	135.0	896	133.6
18	9832	143.4	6508	142.5	5269	142.0	2846	141.2	791	140.1
17	9832	149.3	6508	148.5	5269	148.1	2846	147.1	791	145.7
16	9832	152.6	6508	151.7	5269	151.3	2846	150.3	791	148.9
15.5	9832	152.9	6508	151.9	5269	151.5	2846	150.6	791	149.3
15.4	9832	152.9	6508	151.9	5269	151.5	2846	150.6	791	149.5
15.3	9832	153.0	6508	152.1	5269	151.8	2846	150.9	791	150.0
15.2	9832	153.0	6508	152.2	5269	151.8	2846	150.9	791	150.0
15	8389	153.2	5567	152.3	4512	152.0	2407	151.1	654	150.1
14	8389	163.0	5567	162.2	4512	167.9	2407	160.9	654	160.3
13	8389	169.5	5567	168.4	4512	167.9	2407	166.7	654	164.7
12	8389	171.1	5567	169.8	4512	169.2	2407	167.8	654	165.9
11	5080	172.2	3491	171.0	2880	170.5	1615	169.2	459	167.8
10	5080	177.0	3491	176.4	2880	176.1	1615	174.8	459	171.9
9.5	5080	177.8	3491	176.9	2880	176.4	1615	175.0	459	172.0
9.4	5080	177.8	3491	176.9	2880	176.4	1615	175.0	459	172.0
9.3	5080	178.2	3491	177.1	2880	176.6	1615	175.1	459	172.1
9.2	5080	178.3	3491	177.1	2880	176.6	1615	175.1	459	172.1
9.51	5080	179.0	3491	177.6	2880	176.9	1615	175.3	459	172.1
9.41	5080	179.0	3491	177.6	2880	176.9	1615	175.3	459	172.1
9.31	5080	179.3	3491	177.7	2880	177.1	1615	175.4	459	172.2
9.21	5080	179.3	3491	177.8	2880	177.1	1615	175.4	459	172.2
9	5080	179.5	3491	177.9	2880	177.2	1615	175.4	459	172.2
7.3	5080	184.4	3491	182.1	2880	181.1	1615	178.4	459	175.6
7.2	5080	184.9	3491	182.9	2880	182.0	1615	179.6	459	176.0
7	5080	188.5	3491	186.0	2880	184.8	1615	181.8	459	177.2

1 Critical flow occurs at some discharges

DISCHARGES AND WATER SURFACE ELEVATIONS FOR SELECTED FLOW FREQUENCIES (CON'T)

Cross-	500 year		100 year		50 year		10 year		2 year	
Section	Q (cfs)	El. (ft)	Q (cfs)	El. (cfs)	Q (cfs)	El. (ft)	Q (cfs)	El. (ft)	Q (cfs)	El. (ft)
MATTAWOMAN CREEK, PRESENT CONDITIONS (CONT'D)										
6	5080	189.6	3491	187.0	2880	185.8	1615	182.9	459	179.5
5	5080	189.8	3491	187.2	2880	186.1	1615	183.3	459	181.0
4	5080	190.2	3491	187.8	1080	186.9	1615	185.4	459	184.4
3.3	5080	190.2	3491	187.9	2880	187.1	1615	185.4	459	184.6
3.2	5080	190.5	3491	189.5	2880	189.2	1615	186.4	459	184.6
3	5080	190.6	3491	189.6	2080	189.3	1615	188.1	459	185.0
2	5080	202.2	3491	201.7	2880	201.5	1615	200.6	459	199.5
1.5	5080	203.6	3491	203.0	2880	202.7	1615	201.8	459	200.3
1.4	5080	203.6	3491	203.0	2880	202.7	1615	202.4	459	202.0
1.3	5080	204.5	3491	204.1	2880	203.9	1615	203.4	459	202.7
1.2	5080	204.5	3491	204.1	2880	203.9	1615	203.4	459	202.7
1	5080	204.8	3491	204.4	2880	204.1	1615	203.6	459	202.8
OLD WOMAN'S RUN, PRESENT CONDITIONS										
80	7140	54.5	4800	54.1	3910	54.0	2070	53.6	460	53.1
79	7100	68.6	4730	67.6	3840	67.3	2050	66.2	450	64.4
78	6900	86.5	4600	85.5	3750	85.1	1975	84.1	435	81.9
77	5400	111.7	3600	110.6	2900	110.0	1530	108.7	335	107.0
76.3	5400	112.0	3600	110.8	2900	110.2	1530	108.8	335	107.2
76.2	5400	112.4	3600	111.3	2900	110.9	1530	109.8	335	107.3
76	5350	112.5	3550	111.4	2875	110.0	1520	109.8	330	107.4
75	4950	121.7	3300	120.8	2675	120.4	1400	119.2	310	117.6
74	3850	131.5	2550	130.5	2050	130.0	1080	128.9	240	127.2
73	2320	131.8	1530	130.7	1070	130.3	630	129.2	145	127.4
71	1350	163.0	880	163.0	720	163.0	390	162.3	90	160.4
70.3[1]	1350	165.1	880	165.1	720	165.0	390	165.0	90	162.0
70.2	1350	182.4	880	181.8	720	181.6	390	174.1	90	162.3
70	1150	182.4	770	181.8	630	181.6	340	174.5	80	162.8
PINEY RUN, PRESENT CONDITIONS										
69	8000	121.0	5500	120.4	4540	120.1	2530	118.7	680	120.0
68.3	8000	123.1	5500	122.3	4540	122.2	2530	122.0	680	120.1
68.2	8000	125.8	5500	125.5	4540	125.3	2530	122.1	680	120.1
68	8000	125.9	5500	125.5	4540	125.3	2530	122.8	680	120.3
67[1]	7200	130.3	5000	128.8	4050	127.8	2290	128.8	630	126.2

1 Critical flow occurs at some discharges.

DISCHARGES AND WATER SURFACE ELEVATIONS FOR SELECTED FLOW FREQUENCIES (CON'T)

Cross-	500 year		100 year		50 year		10 year		2 year	
Section	Q (cfs)	El. (ft)	Q (cfs)	El. (cfs)	Q (cfs)	El. (ft)	Q (cfs)	El. (ft)	Q (cfs)	El. (ft)
PINEY RUN, PRESENT CONDITONS (CONT'D)										
66.5	7200	131.0	5000	130.0	4050	129.8	2290	129.1	630	127.5
66.4	7200	131.6	5000	130.8	4050	130.4	2290	129.6	630	128.3
66	7200	131.9	5000	131.1	4050	130.7	2290	129.9	630	128.4
65.5	6750	142.5	4800	141.5	3850	140.9	2170	139.6	590	138.0
65	5870	152.4	4220	151.6	3320	151.1	1920	150.3	535	149.0
64.5	5870	153.2	4220	152.3	3320	151.7	1920	151.0	535	149.2
64.4	5870	153.4	4220	152.5	3320	151.9	1920	151.3	535	149.3
64	5830	153.9	4200	153.2	3300	152.7	1910	152.0	535	150.4
63	4200	161.3	3100	160.4	2375	159.8	1425	158.1	415	158.0
62.5	4200	164.8	3100	164.1	2375	163.5	1425	162.7	415	159.0
62.4	4200	164.9	3100	164.2	2375	163.6	1425	163.0	415	160.8
62	4200	165.4	3100	164.7	2375	164.1	1425	163.4	415	161.9
61.5[1]	3650	172.3	2700	171.1	2075	170.0	1270	169.2	375	169.6
61	3350	187.5	2475	186.9	1800	186.5	1170	185.5	345	182.1
TIMOTHY BRANCH, PRESENT CONDITIONS										
60	4010	176.4	2770	175.7	2300	175.5	1300	175.1	360	171.8
59.3	4010	177.7	2770	177.0	2300	176.6	1300	175.7	360	173.4
59.2	4010	178.1	2770	177.5	2300	177.2	1300	176.2	360	173.5
59	4010	178.5	2770	177.8	2300	177.5	1300	176.5	360	175.3
57.9	3210	182.2	2230	181.0	1825	181.0	1050	179.0	285	179.6
57.8[1,2]	3210	182.2	2230	181.0	1825	181.0	1050	179.0	285	179.5
57.7[1]	3210	183.4	2230	182.2	1825	181.5	1050	179.6	285	179.6
57.6	3210	188.7	2230	184.2	1825	182.4	1050	179.7	285	179.6
57.5	3210	188.7	2230	184.4	1825	182.8	1050	180.2	285	179.6
57.4	3210	188.7	2230	184.6	1825	183.1	1050	180.5	285	179.6
57.3[3]	3210	188.7	2230	184.6	1825	183.1	1050	180.5	285	179.6
57.2	3210	188.7	2230	186.5	1825	183.7	1050	180.8	285	179.7
57.1	3210	188.8	2230	186.6	1825	184.9	1050	181.1	285	179.7
57	3200	188.8	2220	186.6	1820	184.9	1050	181.1	285	179.7
56.5	3130	189.2	2170	187.1	1770	186.5	1000	183.5	275	180.9
56	2875	190.8	2040	189.2	1620	188.8	920	187.7	250	186.2
55	2675	201.4	1850	200.5	1500	199.9	850	198.4	230	196.0
54.5	2075	211.5	1440	210.3	1160	210.1	630	209.4	180	208.0
54	1950	214.9	1350	213.9	1090	213.3	610	211.8	165	209.6

1 Critical flow occurs at some discharges.
2 Tailwater elevation from previous section at 500, 100 and 50 year discharge.
3 Tailwater elevation from previous section at 100 and 50 year discharge

DISCHARGES AND WATER SURFACE ELEVATIONS FOR SELECTED FLOW FREQUENCIES (CON'T)

Cross-	500 year		100 year		50 year		10 year		2 year	
Section	Q (cfs)	El. (ft)	Q (cfs)	El. (cfs)	Q (cfs)	El. (ft)	Q (cfs)	El. (ft)	Q (cfs)	El. (ft)
TIMOTHY BRANCH, PRESENT CONDITIONS (CONT'D)										
53.5	1500	217.8	1035	216.6	820	215.9	470	214.2	125	212.1
53.4	1500	218.0	1035	216.8	820	216.2	470	215.1	125	213.5
53.3	1500	218.3	1035	217.9	820	217.6	470	215.7	125	213.6
53	1500	218.3	1035	217.9	820	217.6	470	216.4	125	214.3
52	1270	218.7	880	218.1	690	217.8	390	216.7	105	215.9
MATTAWOMAN CREEK, FUTURE CONDITIONS										
51	22110	8.4	14262	7.5	11382	7.2	5925	5.4	1936	1.5
50	21585	8.9	13962	7.7	11140	7.4	5763	5.9	1680	3.6
49.3	21585	11.0	13962	8.2	11140	7.6	5763	5.9	1680	3.6
49.2	21585	14.4	13962	8.6	11140	7.8	5763	6.0	1680	3.6
49	21585	14.4	13962	10.3	11140	9.2	5763	6.2	1680	3.6
48	21585	14.6	13962	12.3	11140	11.3	5763	9.3	1680	6.8
47	21691	15.0	13804	12.9	10951	12.1	5565	10.8	1400	9.7
46	21691	16.3	13804	15.0	10951	14.7	5565	13.9	1400	12.2
45	21691	18.3	13804	17.3	10951	15.9	5565	15.9	1400	14.6
44	21691	21.3	13804	20.2	10951	19.7	5565	18.5	1400	16.9
43	18499	26.8	12345	25.7	10030	25.2	5514	24.1	1586	22.5
42	18499	31.2	12345	30.3	10030	29.9	5514	28.9	1586	27.4
41	18499	35.2	12345	34.1	10030	33.6	5514	32.4	1586	30.4
40.3	18041	35.5	12246	34.4	10044	33.9	5537	32.7	1481	30.8
40.2	18041	35.6	12246	34.5	10044	34.0	5537	32.7	1481	30.8
40	18041	36.0	12246	34.9	10044	34.4	5537	33.1	1481	31.1
39.75	18041	39.4	12246	38.4	10044	37.9	5537	36.8	1481	35.1
39.5	18041	43.2	12246	42.4	10044	42.0	5537	41.2	1481	40.2
39	18041	44.7	12246	43.7	10044	43.2	5537	42.0	1481	40.3
38	18041	48.7	12246	47.8	10044	47.4	5537	46.7	1481	45.8
37.5	18041	49.1	12246	48.3	10044	48.0	5537	47.2	1481	46.1
37.4	18041	49.7	12246	49.3	10044	49.1	5537	47.2	1481	46.1
37.3	18041	51.0	12246	50.5	10044	50.3	5537	49.2	1481	46.2
37.2	18041	51.1	12246	50.6	10044	50.3	5537	49.3	1481	46.3
37	13473	51.3	8849	50.7	7220	50.4	4251	49.4	1493	46.7
35	13473	53.9	8849	53.5	7220	53.3	4251	52.9	1493	52.0
34	13473	62.3	8849	61.3	7220	60.9	4251	60.0	1493	58.6
33	13473	63.5	8849	62.5	7220	62.1	4251	61.1	1493	59.6

DISCHARGES AND WATER SURFACE ELEVATIONS FOR SELECTED FLOW FREQUENCIES (CON'T)

Cross-	500 year		100 year		50 year		10 year		2 year	
Section	Q (cfs)	El. (ft)	Q (cfs)	El. (cfs)	Q (cfs)	El. (ft)	Q (cfs)	El. (ft)	Q (cfs)	El. (ft)
MATTAWOMAN CREEK, FUTURE CONDITIONS (CONT'D)										
32.3	13473	63.6	8849	62.6	7220	62.2	4251	61.2	1493	59.6
32.2	13473	63.7	8849	62.6	7220	62.2	4251	61.2	1493	59.6
32.1	13473	64.0	8849	63.0	7220	62.6	4251	61.6	1493	60.1
31	13473	66.3	8849	65.2	7220	64.7	4251	63.6	1493	61.9
30.5	13473	69.6	8849	68.7	7220	68.3	4251	67.5	1493	66.5
30	13473	75.5	8849	74.6	7220	74.3	4251	73.5	1493	72.3
29.5	13473	82.1	8849	81.1	7220	80.6	4251	79.7	1493	78.5
29	13168	87.0	9115	86.1	7616	85.8	4452	84.9	1992	83.9
28	13168	93.2	9115	92.4	7616	92.0	4452	91.0	1992	90.1
27	13168	97.4	9115	96.5	7616	96.2	4452	95.3	1992	94.3
25.3	13168	104.3	9115	102.9	7616	102.1	4452	99.9	1992	97.2
25.2	13168	104.3	9115	102.9	7616	102.2	4452	99.9	1992	97.2
24	13168	107.9	9115	106.4	7616	105.8	4452	104.2	1992	102.5
23[1]	12068	109.8	8042	109.1	6576	109.0	3680	109.0	1148	109.0
22	12068	121.8	8042	121.1	6576	120.7	3680	119.7	1148	117.9
21.5	12068	121.9	8042	121.2	6576	120.8	3680	119.8	1148	118.4
21.4	12068	121.9	8042	121.2	6576	120.8	3680	119.8	1148	118.4
21.3	12068	121.9	8042	121.2	6576	120.8	3680	119.8	1148	118.4
21.2	12068	121.9	8042	121.2	6576	120.8	3680	119.8	1148	118.4
21	12068	122.0	8042	121.2	6576	120.9	3680	119.9	1148	118.5
20	12068	127.4	8042	126.2	6576	125.7	3680	125.2	1148	124.6
19	12068	137.3	8042	136.6	6576	136.2	3680	135.3	1148	133.8
18	10694	143.6	7254	142.7	5956	142.3	3357	141.4	1040	140.3
17	10694	149.5	7254	148.7	5956	148.3	3357	147.3	1040	145.9
16	10694	152.9	7254	151.9	5956	151.5	3357	150.5	1040	149.2
15.5	10694	153.1	7254	152.2	5956	151.7	3357	150.8	1040	149.5
15.4	10694	153.1	7254	152.2	5956	151.7	3357	150.8	1040	149.6
15.3	10694	153.2	7254	152.4	5956	152.0	3357	151.1	1040	150.2
15.2	10694	153.2	7254	152.4	5956	152.0	3357	151.1	1040	150.2
15	9098	153.4	6219	152.6	5118	152.2	2882	151.3	874	150.2
14	9098	163.1	6219	162.4	5118	162.1	2882	161.0	874	160.4
13	9098	169.8	6219	168.7	5118	168.2	2882	167.0	874	165.1
12	9098	171.3	6219	170.1	5118	169.6	2882	168.2	874	166.2
11	5502	172.5	3885	171.3	3257	170.8	1919	169.5	632	168.0
10	5502	177.1	3885	176.7	3257	176.3	1919	175.2	632	172.6

DISCHARGES AND WATER SURFACE ELEVATIONS FOR SELECTED FLOW FREQUENCIES (CON'T)

Cross-	500 year		100 year		50 year		10 year		2 year	
Section	Q (cfs)	El. (ft)	Q (cfs)	El. (cfs)	Q (cfs)	El. (ft)	Q (cfs)	El. (ft)	Q (cfs)	El. (ft)
MATTAWOMAN CREEK, FUTURE CONDITIONS (CONT'D)										
9.5	5502	178.0	3885	177.2	3257	176.7	1919	175.4	632	172.7
9.4	5502	178.0	3885	177.2	3257	176.7	1919	175.5	632	172.7
9.3	5502	178.5	3885	177.4	3257	176.9	1919	175.5	632	172.8
9.2	5502	178.5	3885	177.4	3257	176.9	1919	175.5	632	172.8
9.51	5505	179.4	3885	178.0	3257	177.4	1919	175.8	632	172.9
9.41	5502	179.4	3885	178.0	3257	177.4	1919	175.8	632	172.9
9.31	5502	179.7	3885	178.2	3257	177.5	1919	175.8	632	172.9
9.21	5502	179.7	3885	178.2	3257	177.5	1919	175.9	632	172.9
9	5502	179.9	3885	178.3	3257	177.6	1919	175.9	632	172.9
7.3	5502	185.0	3885	182.7	3257	181.7	1919	179.1	632	176.0
7.2	5502	185.6	3885	183.4	3257	182.5	1919	180.2	632	176.7
7	5502	189.1	3885	186.7	3257	185.6	1919	182.6	632	178.1
6	5502	190.3	3885	187.7	3257	186.6	1919	183.7	632	180.1
5	5502	190.4	3885	187.9	3257	186.8	1919	184.0	632	181.3
4	5502	190.7	3885	188.4	3257	187.4	1919	185.6	632	184.8
3.3	5502	190.8	3885	188.5	3257	187.6	1919	185.7	632	184.9
3.2	5502	190.9	3885	189.7	3257	189.4	1919	188.5	632	184.9
3	5502	191.0	3885	189.8	3257	189.4	1919	188.5	632	185.5
2	5502	202.4	3885	201.9	3257	201.8	1919	200.8	632	199.8
1.5	5502	203.8	3885	203.1	3257	202.8	1919	202.1	632	200.6
1.4	5502	203.8	3885	203.1	3257	202.8	1919	202.4	632	202.0
1.3	5502	204.6	3885	204.2	3257	204.0	1919	203.6	632	202.8
1.2	5502	204.6	3885	204.2	3257	204.0	1919	203.6	632	202.8
1	5502	204.9	3885	204.5	3257	204.3	1919	203.7	632	202.9
TIMOTHY BRANCH,[1] FUTURE CONDITIONS										
60	4331	175.6	3047	175.8	2576	175.6	1534	175.2	500	172.3
59.3	4331	177.9	3047	177.15	2576	176.9	1534	175.9	500	173.7
59.2	4331	178.3	3047	177.65	2576	177.4	1534	176.4	500	174.9
59	4331	178.7	3047	177.95	2576	177.65	1534	176.7	500	173.5
57.9[2]	3467	182.5	2453	181.3	2044	181.0	1239	179.5	396	179.6
57.8[2]	3467	182.5	2453	181.3	2044	180.2	1239	179.5	396	179.4

1 500 year elevations extrapolated from present condition rating curve.
2 Critical flow occurs at some discharges.

DISCHARGES AND WATER SURFACE ELEVATIONS FOR SELECTED FLOW FREQUENCIES (CON'T)

Cross-	500 year		100 year		50 year		10 year		2 year	
Section	Q (cfs)	El. (ft)	Q (cfs)	El. (cfs)	Q (cfs)	El. (ft)	Q (cfs)	El. (ft)	Q (cfs)	El. (ft)
TIMOTHY BRANCH,[1] FUTURE CONDITIONS										
57.7	3467	183.75	2453	182.5	2044	181.9	1239	179.95	396	179.6
57.6	3467	189.7	2453	182.5	2044	183.5	1239	180.4	396	179.6
57.5	3467	189.8	2453	185.45	2044	183.6	1239	180.8	396	179.8
57.4	3467	189.9	2453	185.5	2044	183.8	1239	181.2	396	179.8
57.3	3467	189.9	2453	185.5	2044	183.8	1239	181.2	396	179.8
57.2	3467	189.9	2453	187.0	2044	185.2	1239	181.5	396	179.9
57.1	3467	189.9	2453	187.1	2044	185.9	1239	182.0	396	180.0
57	3456	189.9	2442	187.2	2038	186.0	1239	182.0	396	180.0
56.5	3380	189.9	2387	187.5	1982	186.8	1180	184.3	382	181.4
56	3105	191.2	2244	189.6	1814	189.0	1086	187.95	348	186.5
55	2889	201.6	2035	200.7	1680	200.3	1003	198.8	320	196.3
54.5	2241	211.77	1584	210.6	1299	210.2	743	209.55	250	208.23
54	2106	215.4	1485	214.1	1221	213.6	720	212.1	229	209.95
53.5	1620	218.15	1139	216.9	918	216.25	555	214.6	174	212.4
53.4	1620	218.3	1139	217.1	918	216.3	555	215.4	174	213.7
53.3	1620	218.4	1139	218.0	918	217.7	555	216.2	174	213.9
53	1620	218.4	1139	218.0	918	217.7	555	216.7	174	214.6
52	1372	218.8	968	218.25	773	217.95	460	216.9	146	216.0
OLD WOMAN'S RUN FUTURE CONDITIONS										
80	7426	54.53	5040	54.15	4145	54.03	2256	53.65	547	53.13
79	7384	68.7	4967	67.7	4070	67.4	2235	66.3	536	64.5
78	7176	86.7	4830	85.6	3975	85.2	2153	84.2	518	82.1
77	5616	111.85	3780	110.7	3074	110.15	1668	108.8	399	107.0
76.3	5616	112.2	3780	110.9	3074	110.35	1668	108.95	399	107.3
76.2	5616	112.5	3780	111.4	3074	110.0	1668	109.9	399	107.5
76	5564	112.7	3728	111.5	3048	111.1	1657	109.9	393	107.5
75	5148	121.9	3465	120.9	2836	120.3	1526	119.3	369	118.2
74	4004	131.65	2678	130.6	2173	130.2	1177	129.0	286	127.35
73	2413	131.9	1607	130.9	1134	130.2	687	129.3	173	127.6
71[2]	1404	163.0	924	163.0	763	163.0	425	162.5	107	160.7
70.3[2]	1404	165.2	924	165.2	763	165.1	425	165.0	107	162.2
70.2	1404	182.5	924	181.9	763	181.6	425	174.7	107	163.0
70	1196	182.7	809	182.0	668	181.6	371	175.3	95	163.3

1 500 year elevations extrapolated from present condition rating curve.
2 Critical flow occurs at some discharges.

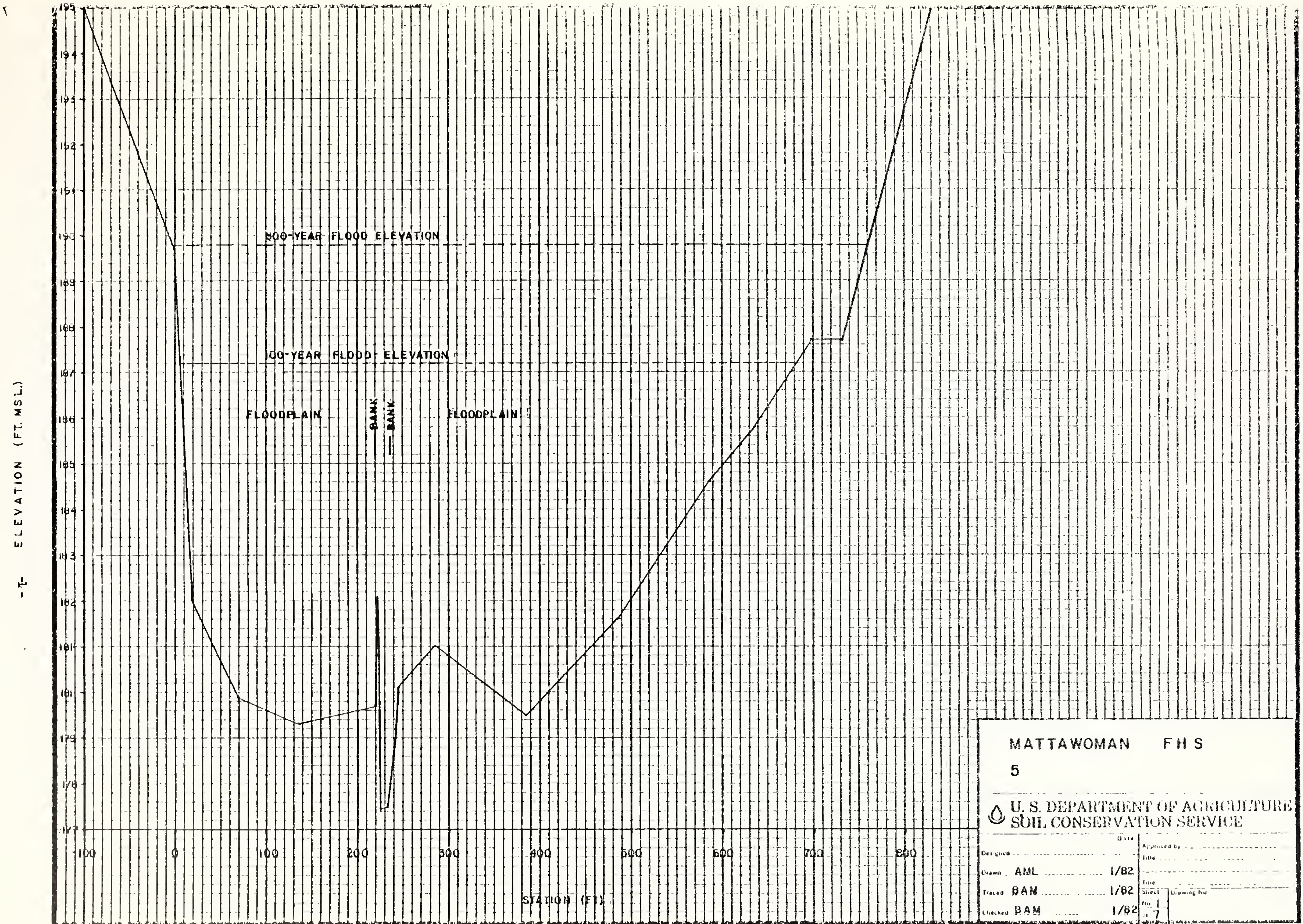
DISCHARGES AND WATER SURFACE ELEVATIONS FOR SELECTED FLOW FREQUENCIES (CON'T)

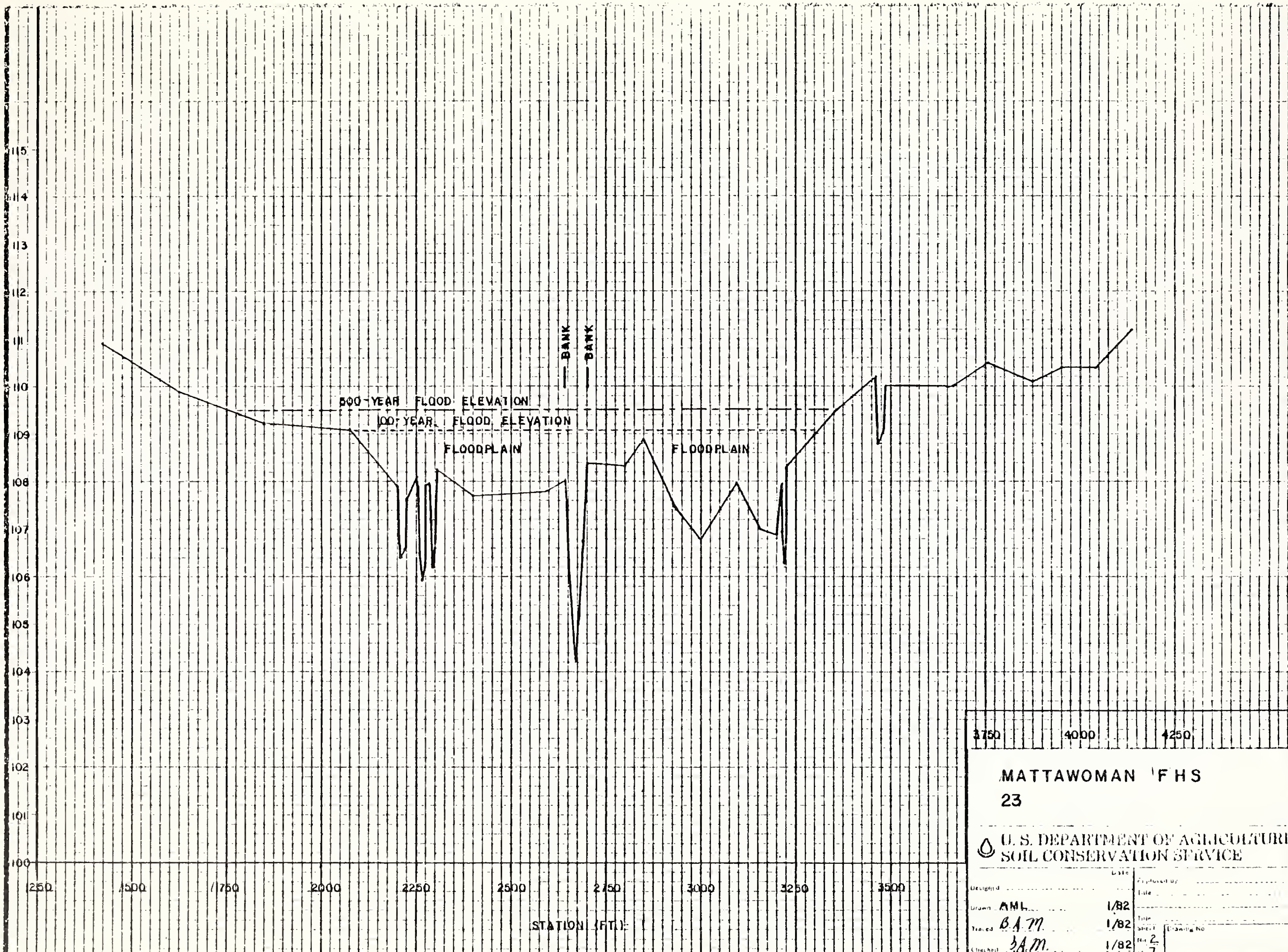
Cross-	500 year		100 year		50 year		10 year		2 year	
Section	Q (cfs)	El. (ft)	Q (cfs)	El. (cfs)	Q (cfs)	El. (ft)	Q (cfs)	El. (ft)	Q (cfs)	El. (ft)
PINEY RUN[1]	FUTURE CONDITIONS									
69[2]	8720	121.2	6215	120.6	5221	120.4	3011	119.1	1020	119.8
68.3	8720	123.4	6215	122.5	5221	122.3	3011	122.0	1020	120.5
68.2	8720	125.9	6215	125.6	5221	125.5	3011	122.9	1020	120.5
68	8720	126.0	6215	125.6	5221	125.5	3011	123.4	1020	120.7
67[2]	7848	130.7	5650	129.2	4658	128.5	2725	128.5	945	126.7
66.5	7848	131.25	5650	130.3	4658	129.9	2725	129.3	945	127.8
66.4	7848	131.85	5680	131.0	4658	130.6	2725	129.85	945	128.5
66	7848	132.1	5650	131.35	4658	131.0	2725	130.1	945	128.7
65.5	7358	142.8	5424	141.85	4428	141.3	2582	139.9	885	138.3
65	6398	152.7	4769	151.6	3818	151.2	2285	150.5	803	149.25
64.5	6398	153.5	4769	152.6	3818	152.1	2285	151.2	803	149.5
64.4	6398	153.7	4769	152.7	3818	152.2	2285	151.45	803	149.6
64	6355	154.1	4746	153.4	3795	153.0	2273	152.2	803	150.7
63	4578	161.7	3503	160.7	2731	160.1	1696	158.65	623	158.0
62.5	4578	165.0	3503	164.4	2731	163.8	1696	162.9	623	159.8
62.4	4578	165.2	3503	164.5	2731	163.9	1696	163.15	623	161.2
62	4578	165.6	3503	165.0	2731	164.4	1696	163.6	623	161.45
61.5[2]	3979	172.75	3051	171.55	2386	170.55	1511	169.5	563	169.5
61	3652	187.7	2797	187.2	2070	186.7	1392	185.85	518	182.8

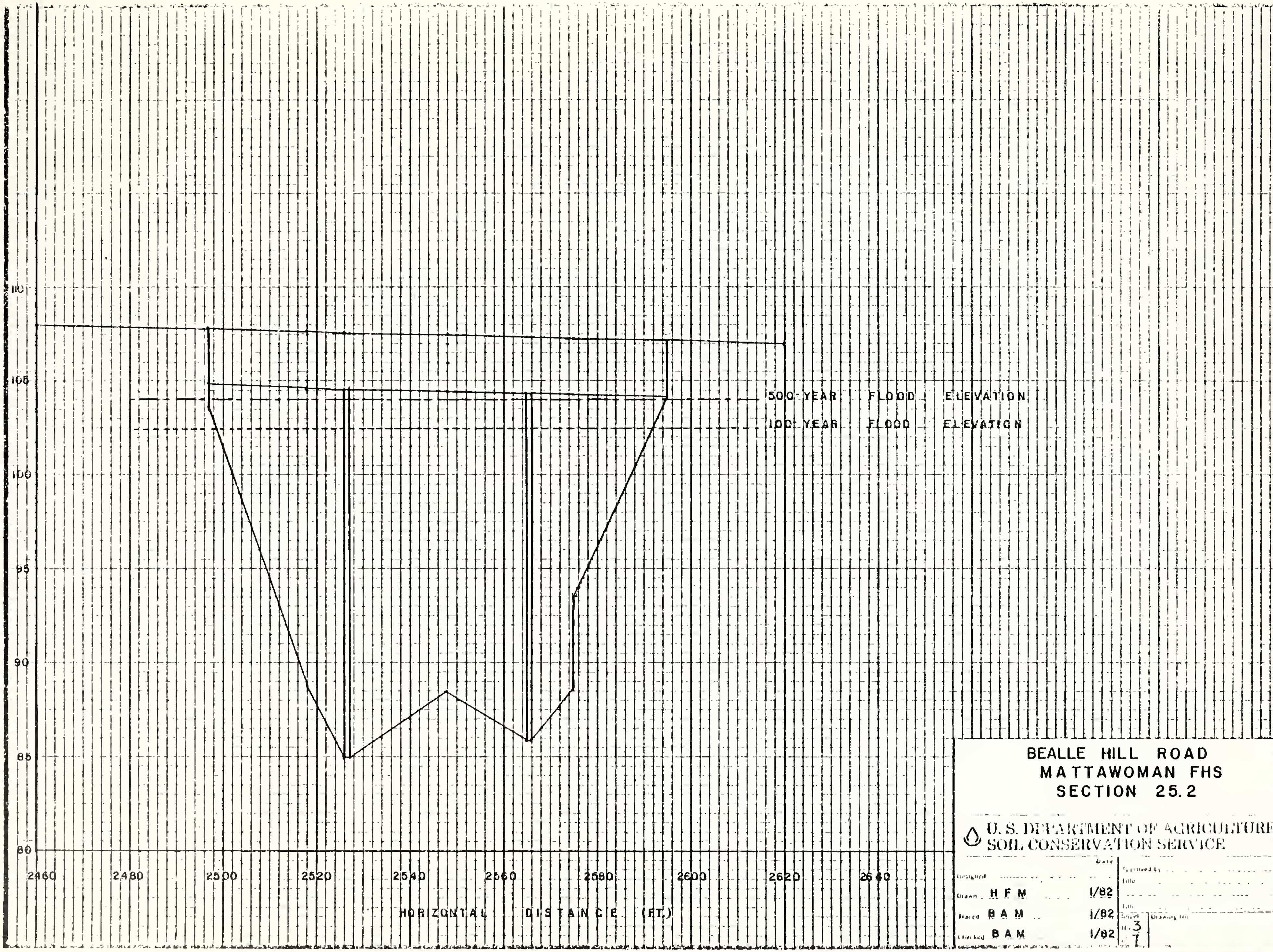
1 500 year elevations extrapolated from present condition rating curve.
2 Critical flow occurs at some discharges.

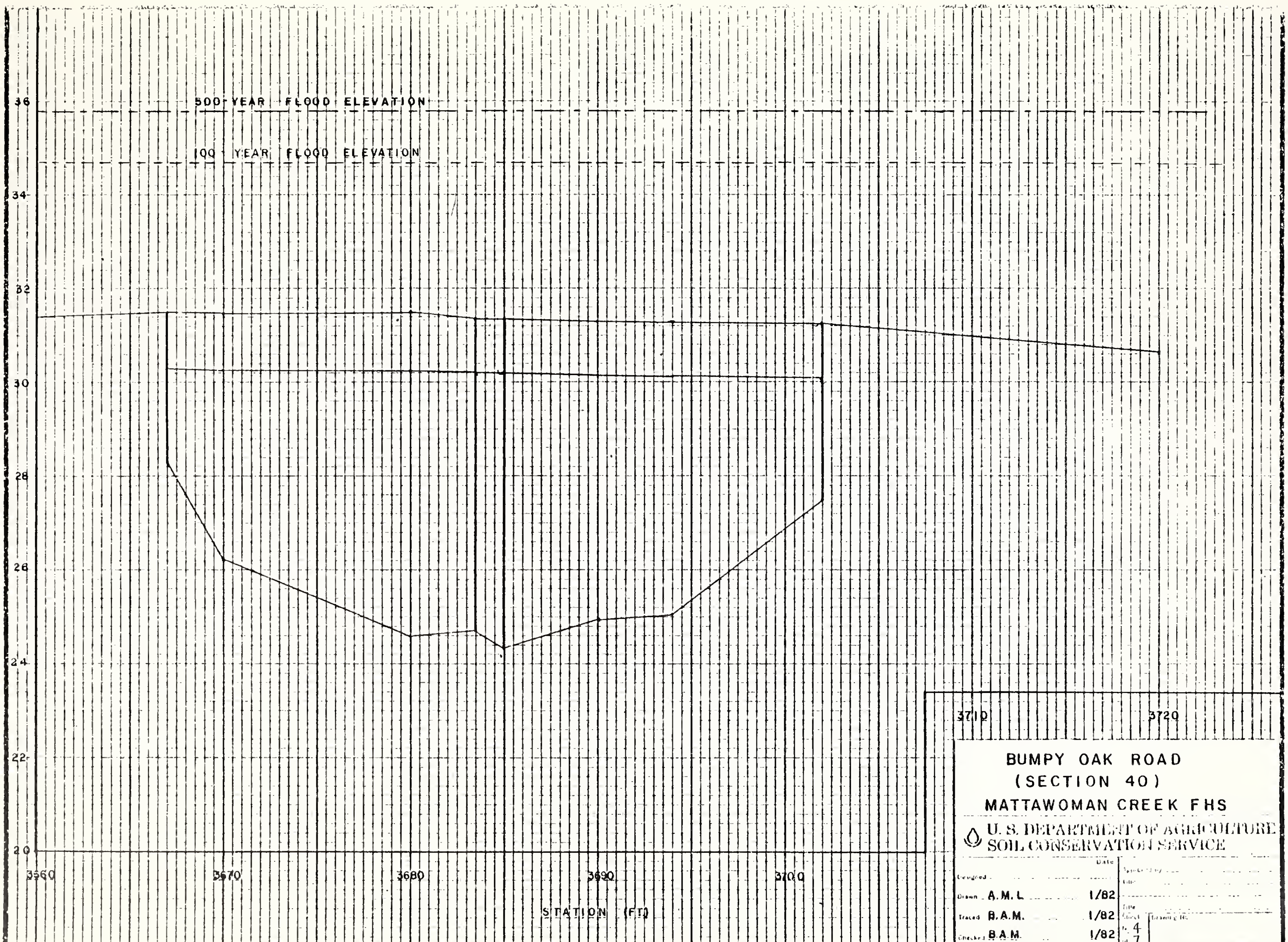
APPENDIX C:

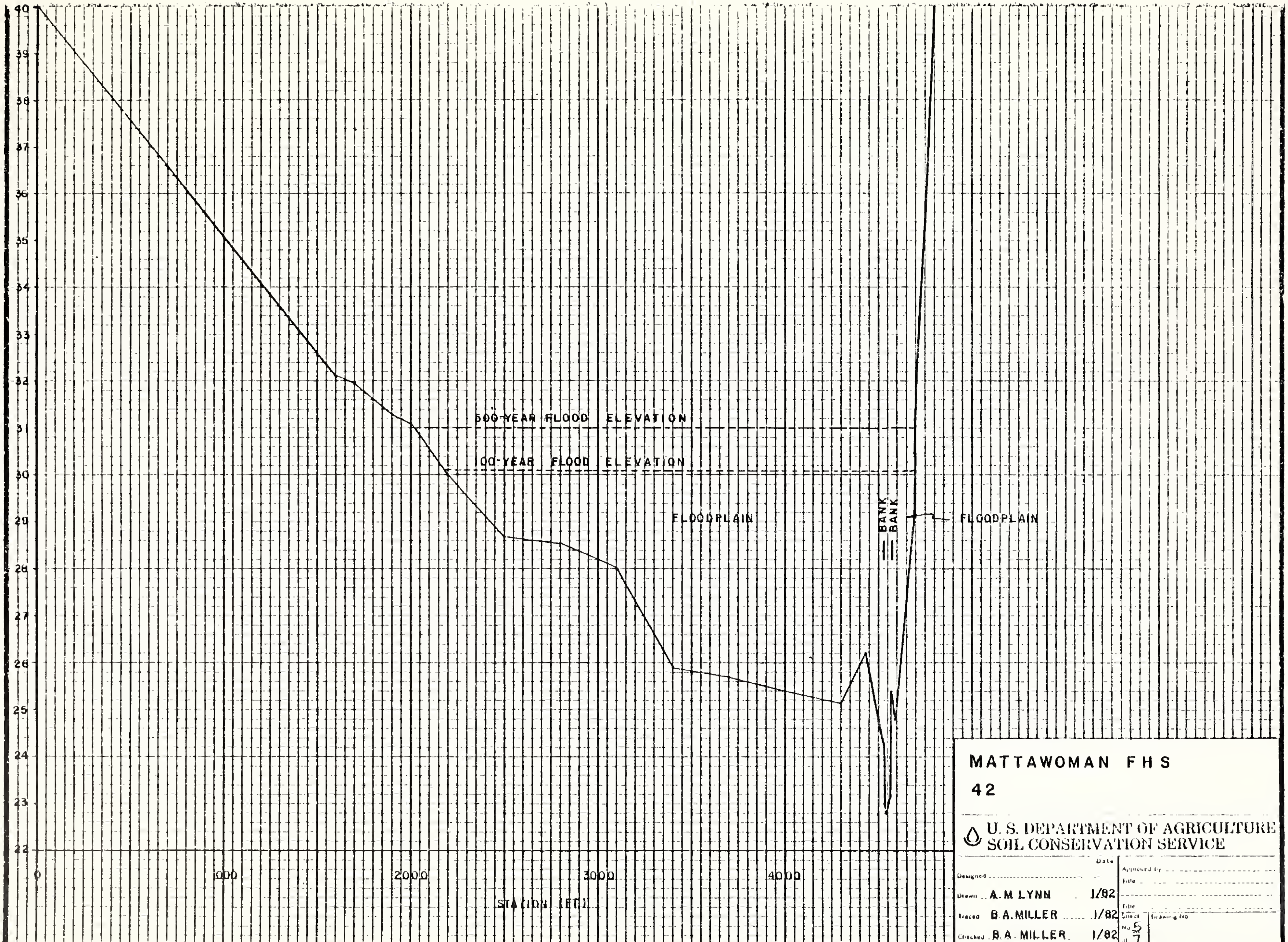
TYPICAL CROSS-SECTIONS

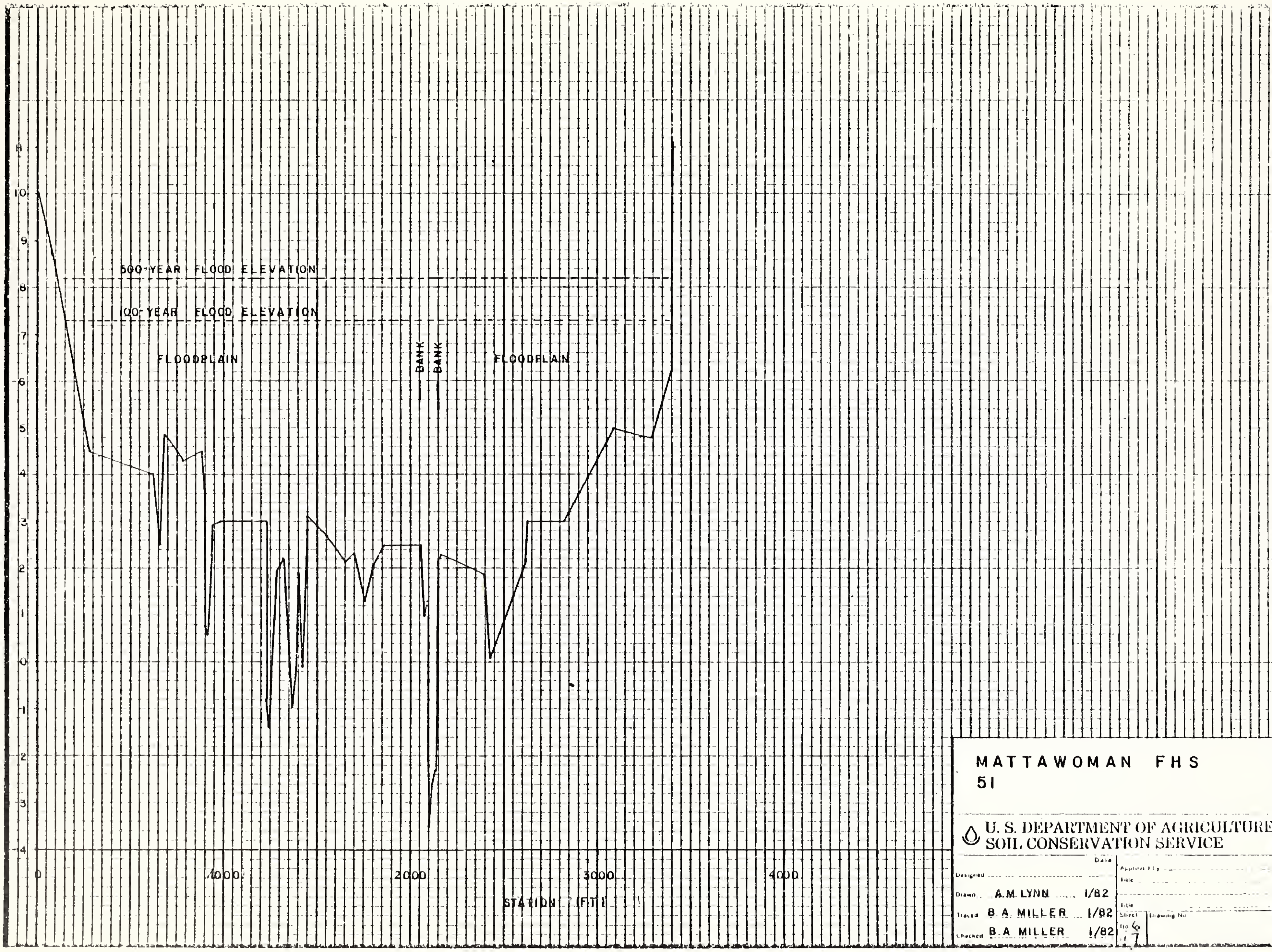

ELEVATION (FT. MSL)
STATION (FT)
-100
0
100
200
300
400
500
600
700
800
195
194
193
192
191
190
189
188
187
186
185
184
183
182
181
180
179
178
177
500-YEAR FLOOD ELEVATION
100-YEAR FLOOD ELEVATION
FLOODPLAIN
BANK
BANK
FLOODPLAIN
MATTAWOMAN FHS
5
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Designed
Drawn AML 1/82
Traced BAM 1/82
Checked BAM 1/82
Date
Approved by
Title
Sheet
Drawing No.
No. 1
7

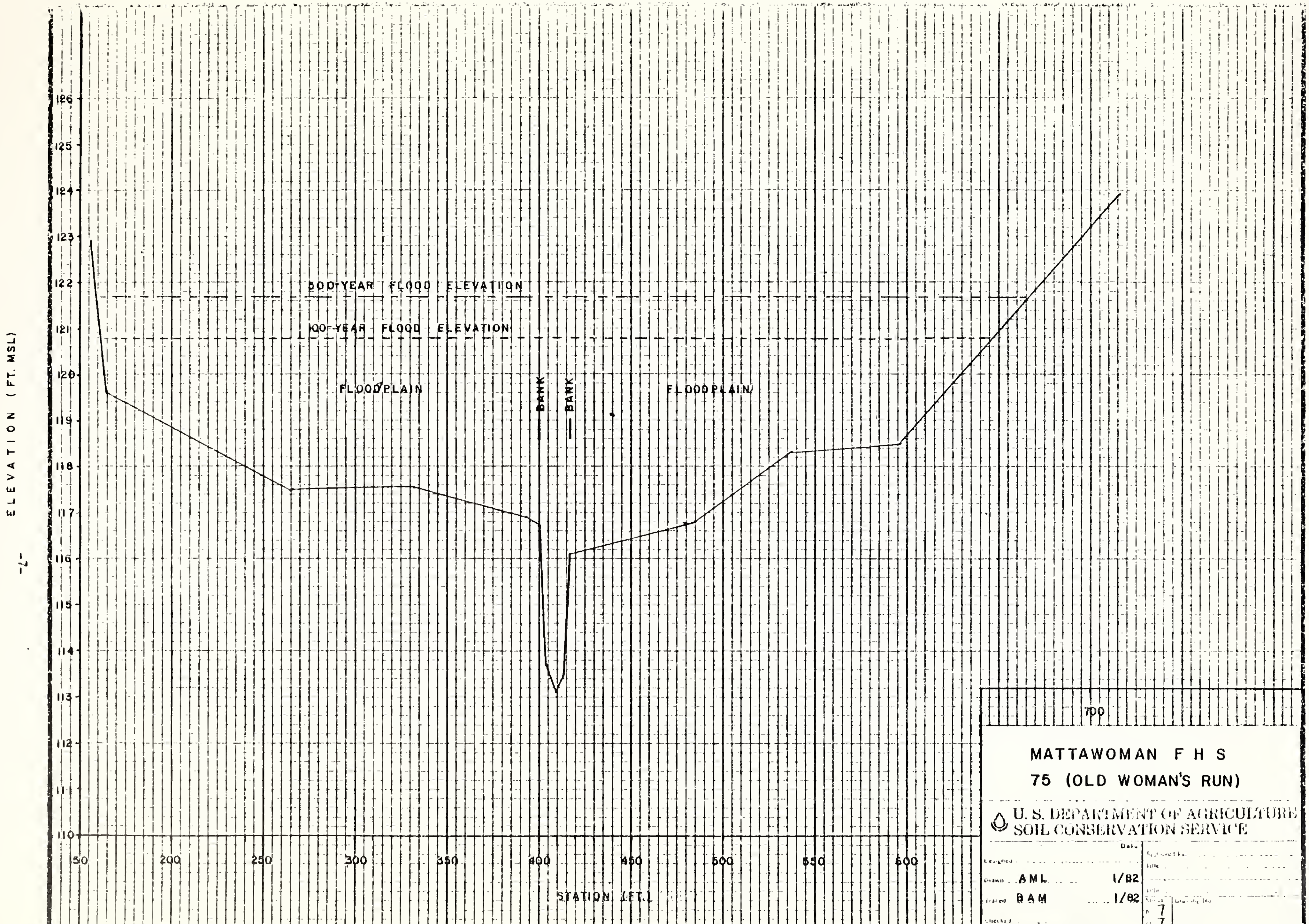

ELEVATION (FT. MSL)
115
114
113
112
111
110
109
108
107
106
105
104
103
102
101
100
500-YEAR FLOOD ELEVATION
100-YEAR FLOOD ELEVATION
FLOODPLAIN
FLOODPLAIN
BANK
BANK
1250
1500
1750
2000
2250
2500
2750
3000
3250
3500
3750
4000
4250
STATION (FT.)
MATTAWOMAN FHS
23
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Drawn AML 1/82
Traced B.A.M. 1/82
Checked B.A.M. 1/82
Sheet No. 2 of 7


ELEVATION (FT. MSL)
110
105
100
95
90
85
80
2460
2480
2500
2520
2540
2560
2580
2600
2620
2640
HORIZONTAL DISTANCE (FT.)
500-YEAR FLOOD ELEVATION
100-YEAR FLOOD ELEVATION
BEALLE HILL ROAD
MATTAWOMAN FHS
SECTION 25.2
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Drawn H F M 1/82
Traced B A M 1/82
Checked B A M 1/82
3
7


500 YEAR FLOOD ELEVATION
100 YEAR FLOOD ELEVATION
36
34
32
30
28
26
24
22
20
ELEVATION (FT. MSL)
3660
3670
3680
3690
3700
3710
3720
STATION (FT)
BUMPY OAK ROAD
(SECTION 40)
MATTAWOMAN CREEK FHS
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Date
Designed
Drawn A. M. L. 1/82
Traced B. A. M. 1/82
Checked B. A. M. 1/82
Sheet 4 of 7
Drawing No.


500-YEAR FLOOD ELEVATION
100-YEAR FLOOD ELEVATION
FLOODPLAIN
BANK
BANK
FLOODPLAIN
ELEVATION (FT. MSL.)
STATION (FT.)
0
1000
2000
3000
4000
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
MATTAWOMAN FHS
42
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Drawn A. M. LYNN 1/82
Traced B. A. MILLER 1/82
Checked B. A. MILLER 1/82
5
7


ELEVATION (FT. MSL)
500-YEAR FLOOD ELEVATION
100-YEAR FLOOD ELEVATION
FLOODPLAIN
BANK
BANK
FLOODPLAIN
0
1000
2000
3000
4000
STATION (FT)
MATTAWOMAN FHS
51
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Drawn A.M. LYNN 1/82
Traced B.A. MILLER 1/82
Checked B.A. MILLER 1/82



500-YEAR FLOOD ELEVATION
100-YEAR FLOOD ELEVATION
FLOODPLAIN
BANK
BANK
FLOODPLAIN
ELEVATION (FT. MSL)
STATION (FT.)
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
150
200
250
300
350
400
450
500
550
600
700
MATTAWOMAN F H S
75 (OLD WOMAN'S RUN)
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Date
Drawn AML 1/82
Traced BAM 1/82
7
7

APPENDIX D:

PHOTOGRAPHS

Figure 1. View looking upstream towards the Route 225 bridge over Mattawoman Creek near the downstream limit of the study area. The 500-year flood reaches the bridge but does not overtop it.

Figure 2. Mattawoman Creek upstream of Route 225. The flood plain is wooded and swampy with dense vegetation. This location is within the Mattawoman Natural Environment Area. The creek has a main channel with numerous smaller side channels winding through the flood plain.

Figure 3. Billingsley Road and Mattawoman Creek. This wooden plank bridge is frequently flooded.

Figure 4. Wooded swamp at Bealle Hill Road. Outbuildings in this area were flooded during Agnes and Eloise. One resident has built a series of platforms that allow his livestock to climb to higher levels during future floods.

Figure 5. Debris and the Mattawoman Interceptor Sewer Right-of-Way. The sewer line right-of-way is poorly vegetated and eroding in some places. Unauthorized dumping is common in many floodplains, especially where access is relatively easy. This scene is just downstream of Sharpersville Road.

Figure 6. Acton Road Bridge over Mattawoman Creek. The undersized concrete bridge here is frequently flooded. The debris reduces channel capacity and further aggravates the problem.

Figure 7. Channel downstream of Acton Road. This collection of manmade and natural debris has formed a log jam, which very effectively blocks flow during floods. Such jams will build up with each high flow as more material catches in them, and they generally require a stream clean-up program for their removal.

Figure 8. Route 301 Road Bridge. The box culvert is wide and high compared to the channel, and carries flood flows with a comfortable clearance.

APPENDIX E:

INVESTIGATIONS AND ANALYSIS

INVESTIGATIONS AND ANALYSES

Hydraulic: Channel and floodplain sections, bridge data, and n-values were surveyed and collected in the field. The base maps was mosaiced from USGS quads. The Corps of Engineers water surface profile computer program HEC2 was used to compute the flood heights at the cross-section locations for specific discharges corresponding to flows of various frequencies. The flood elevations between cross-sections were interpolated.

HYDROLOGIC: Land use data compiled from county plans and investigation by field office personnel were overlaid with soils data to generate Runoff Curve numbers. Weighted Curve Numbers were calculated for each subwatershed. Times of concentration were calculated using overland flow length and in-channel flow velocities developed from observations of small swales and headwater channels in the watershed, plus the cross-sections used in the water surface profile.

Flow frequency was determined using the SCS TR-20 hydrologic model with rainfall input determined by special study of the existing streamgage records and rainfall frequency.

NATURAL VALUES

The staff biologist and field office personnel provided information on the floodplain's more unique features and habitats. The State Archeologist office, the National Capitol Park and Planning Commission, and the field offices provided information on historical and archeological sites. Prime farmlands were identified on the watershed map and measured.

ECONOMICS: Values given for damage estimates were developed by the staff economist after examination of the available data and a tour of the damage areas.

LOCAL MANAGEMENT ALTERNATIVES: These were developed by the planning staff after reviewing the watershed application and touring the watershed as being appropriate alternatives. The Steering Committee, Technical Committee, and the field offices reviewed and contributed to them.

PUBLIC PARTICIPATION: After a field review of the watershed on August 22, 1978, it was evident a flood plain delineation would be necessary before further decisions towards a watershed work plan could be made. The Technical Advisory Committee, members of the Steering Committee, concerned citizens and the watershed planning staff participated in this field review. On November 16, 1978, the Mattawoman Steering Committee met with SCS and the need for a flood hazard study discussed. The plan of Study was prepared in January 1979 and approved in March of that year. SCS and DNR will present this report jointly to the sponsors after its completion in 1983. Both agencies can provide interpretation of technical data to assist the sponsors in the development, modification, or implementation of their local floodplain management programs. Under their watershed planning programs, the agencies can also provide technical assistance and cost sharing for watershed planning and project implementation to qualifying projects.